A STUDY OF FERTILIZER INDUSTRY OF INDIA SINCE 1970

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SHARFUL HODA

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PROF. MOHD. YUSUF

DEPARTMENT OF ECONOMICS
ALIGARH MUSLIM UNIVERSITY
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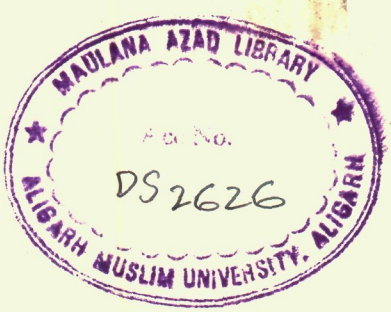

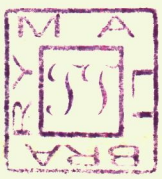

PROFESSOR
Department of Economics

ALIGARH MUSLIM UNIVERSITY
ALIGARH (INDIA)

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TO WHOM IT MAY CONCERN

It is to certify that Mr. SHARFUL HODA has completed his M.Phil dissertation on "A STUDY OF FERTILIZER INDUSTRY OF INDIA SINCE 1970" under my supervision. It is an original piece of research work and worth submitting for the award of M.Phil degree in Economics.

(PROF. MOHD. YUSUF)
SUPERVISOR

IN SWEET MEMORY

OF MY

UNCLE

AL-HAJ DR. MOHD. SHAMSUL HODA

C O N T E N T S

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Sharful Hoda

Dated: 30-04-1994 (SHARFUL HODA)

ALIGARH.

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C H A P T E R - I

I n t r o d u c t i o n

C H A P T E R - I

Fertilizer as a Significant Farm Input:

Before Independence Indian agriculture was almost traditional in its character where the main factors of production land and labour with few purchased inputs were mainly used by the farmers. The correlation between farm size and family size was not direct but inverse. The division of land and fragmentation of small farm land exacerbates in equality in the distribution of land and agricultural income. On the output side the emphasis was on self-sufficiency of the farm families that is to produce foodgrains and other crops mostly for their own consumption. The proportion of farm output was not made available for marketing except the small percentage of farmers in semi-subsistence agriculture produced partly for their own consumption and partly for the market. The productivity was hopelessly low especially due to technological backwardness. Production was increased through the greater application of traditional farm of cultivation depending upon family labour and self-made capital, whenever, expansion of production was noted the fact that it occur through an inevitable symmetrical expansion of all inputs are through increasing efforts utilizing more human hands

which were already in abundants and having low productivity. Consequently, the expansion was accompanied by declining income and productivity per annum. During this period agriculture constituted a large proportion of the economy, demand for agricultural product was rising rapidly due to demographic effects, the linkage effect was nominal due to low degree of industrialization facing the problem of capital investment and the low farm income, the institutional set up in agricultural was a great hurdle and the last but not the least the inadequate infrastructure facilities. Therefore, the poverty, backwardness, illiteracy, disease, unemployment, were the main characteristics of pre-independent India.

From the very first day of independence Government of India showed its highest concerned towards the giant problems. It envisaged planned development of agriculture and industry under the Planning Commission launching and introducing successive five year plans in the country. Even after a decade of plan development in the country the shape of agriculture did not much change and improved India had a setback not producing sufficient foodgrains for meeting domestic requirements. It was timely well realized in the early sixties that without an adequate sustain growth of agriculture

India could not succeed to overcome the vicious circle of poverty and unemployment without especial emphasis on the agricultural development in the country. It was a great challenge for the Government at that time especially when rate of saving and investment were very low. She did not have enough foreign exchange to buy higher technology to used in agriculture. The developed countries were using advanced and costly technology that India was not in a position to afford not only due to financial constraint but due to socio-economic framework. Though Government of India introduced very important institutional, structural and organizational changes in agriculture, yet they did not have expected impact on agriculture to receive better fruits in the form of higher production and productivity. These changes either not made adequate amounts or they were not properly implemented. Therefore, Government of India finally chose the best possible technology most adaptable to the Indian conditions. It was certainly the low cost and mild technology.

Adoption of the choice of a particular technique needs to study its different implications such as costs, change in the proportions of the inputs and the productivity. In the country like India where a substantial under-employment

prevailed in the agricultural sector, labour might not be dislodged unless until there was better opportunity for its absorption some were else in the economy most probably in the industrial sector. It was not only the cost aspects of the technology but these aspects were of crucial importance. The most striking feature of Indian agriculture that some inputs requisite to high levels of productivity were not available in sufficient quantity relative to those which were abundant consequently resource that is labour was used at very low or even zero level of marginal productivity in agriculture. Under such circumstances significant increase in production and productivity would only be obtained by increasing inputs of a particular set of a scare resources. Thus India introduced technological changes in agriculture emphasizing high yielding varieties supported by adequate fertilizers and water. How large an increase in production would be achieved through introduction of a limited set of scare inputs depends on the nature and the quantity of abundant resource and a number of a technical, educational and institutional changes. Since Government of India put an emphasis on increased quantity of fertilizers for raising foodgrains crops and non-food-grain crops in the country.

Our objective is to study various aspects of fertilizers such as agricultural production, productivity, consumption of fertilizers and importation vis-a-vis the effects on production, productivity in fertilizer industry, farmers' attitude and Government policies, etc.

The need for fertilizer application in Indian agriculture was felt long back in 19th century but this has become more effective in recent times. The ever increasing population requires foodgrains in abundant quantity as India is accommodating nearly 84 crores of people constituting 15.3 percent of the world population with only 2.3 percent of world cultivated land. The population which was only 36 crores in 1951 has increased by 133 percent till 1991. This high pressure of population has forced to plough more than 46 percent of entire area reported for land utilization purposes. The number of people depending per hectare of arable land which was 2.2 in 1951 has increased to 4.9 in 1989 and it is assumed to cross 6.0 by the turn of the century. The land-man ratio is decreasing resulting in greater pressure on the land to produce more and more agricultural output which was reinforced the need to increase

crop productivity per unit of land[1] and it is not possible without proper, judicious and balanced use of fertilizers as it has been accepted as one of the vital inputs essential for the development of crops, the other being improved seeds, technology back-up, plant protection services, machinery, soil management, credit facilities and irrigation facilities etc.[2]

The improved seeds in the form of HYVs of paddy, wheat and maize etc. require fertilizer in more quantities as the soil is not of that fertility to bear the burdens of nutrient erosion due to HYVs cultivation which has increased from 18.9 lakh hectares in 1960 to 670 lakh hectares in 1990-91. It is a fact that India has achieved self-sufficiency in food-grain production with a record harvest of 1772 lakh tonnes during 1990-91 which can be attributed to the use of fertilizer nutrient, there is 7 to 8 tonnes of foodgrains increases.[3] In early 80s 35 to 40 percent of foodgrains production could be attributed to fertilizer use.[4] But now it has been estimated that 70 percent growth in agriculture can be attri-

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1. Tondon, H.L.S. & Narayan, P. : Fertilizers in Indian Agriculture (Past, Present and Future 1950-2000), Fertilizer Development and Consultation Organization, New Delhi,1990,pp.7-8.
2. Shenoi, P.V. : Development of Indian Agriculture during VIIth Plan, Fertilizer in Agricultural Development, Kribhco, 1988, pp.22-26.
3. India 1990: Ministry of Information and Broadcasting, Govt.of India, New Delhi, pp.383-96.
4. Fertilizer Association of India : Annual Review of Fertilizer Production and Consumption 1990-91, Fertilizer News, New Delhi Sept. 1991, p.71.

buted to increased use of fertilizers. The dependence on fertilizers will increase further as the soil can be made able to bear the burden of increasing agricultural production without external support which will be made available in the form of organic, inorganic and biological source of plant nutrients.[5]

Sixteen elements of nutrients have been considered essential for growth and development of plants. Carbon, hydrogen and oxygen are provided by air and water where the remaining are made available by soils, fertilizer and manures. They are : (i) Macro nutrients like Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S), Calcium (Ca) and Magnesium (Mg); and (ii) Micro nutrients like Borone (B), Chlorine (Cl), Copper (Cu), Iron (Fe), Manganese (Mn), Molybdemn (Mo) and Zinc (Zn).[6] Additions of N, P, K, Zn and S to the soil are of great importance because their deficiency in Indian soils are widespread. Fertilizers are used to correct those deficiencies.[7] The air contains 79 percent nitrogen and is

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5. Tondon, H.L.S. and Narayan, P.: Op.cit., p.25.

6. Ibid., p.14.

7. Ibid., p.16.

virtually inexhaustible but the plants cannot use them directly and this has to be converted into ammonia or nitrate before the plants can absorb and use it for growth. The fertilizer factories essentially capture N present in the air to synthesize ammonia or nitrate and make a wide range of fertilizer products.[8] Hence the policy regard on fertilizers must ensure the availability of this critical input in reasonable quantities in all parts of the country. The development of fertilizer Industry in India has been synonymous with a rapidly growing agriculture.

In this our approach to the problem we would like to analyse the capacity, production, consumption, import and basic policies regarding fertilizer industry of India since 1970 onwards, under the influence of policies and administrative arrangements aimed at consolidating on the gains of Green Revolution. While keeping consumer price low, efforts were also made to impart vitality to fertilizer promotion, which in their turn have contributed to economic activities and spur to the development of agriculture sector with trade and commerce.

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8. Randhawa, N.S. & Tondon, H.L.S., : Advances in Soil Fertility and Fertilizer Use Research in India, Fertilizer News, Fertilizer Association of India, New Delhi, Feb. 1982,pp.11-2

Objective of the Study:

The general objective of the study is to examine levels of install capacity utilization, production and consumption of fertilizers to the agricultural development in India since 1970.

i) To highlight the problems of agricultural production and productivity since pre-green revolution period and use of fertilizers.

ii) To evaluate the install capacity utilization of fertilizer industry both nitrogen and phosphorus fertilizers.

iii) To judge the performance of production, consumption and their imports of fertilizers of India since 1970.

iv) To examine the basic government policies like price, subsidy, distribution, warehousing and different schemes regarding fertilizer industry, and

v) To suggest some measures to revamp the problems and further improvement of fertilizer industry in India.

Scope and Methodology :

Fertilizer Industry has important influence on the structure and balance of agricultural production especially demand for foodgrains in developing countries like India. The scope of the present study is, however, limited only to the first, namely the study of fertilizer industry of India since 1970. Further the present study encompasses the period from 1970 to 1990 onwards, i.e., the period of more than two decades. This is a crucial period in the study on fertilizer or on any other issue pertaining to fertilizers. The significance lies in the fact that after 1951 the issue of chemical fertilizers has been widely debated since the early 1970. Moreoverm a period of 20 years is sufficient enough to arrive at a meaningful conclusion.

The methodology in this dissertation is analytical in nature. We have tried to examine the problems relating to the subject with the help of the data, taken from secondary source, mainly from the Fertilizer Association of India. Other sources are too numerous to be mentioned here. Due acknowledgements have been given to them at appropriate place. Simple statistical tools have also been used to process the data and to reach the meaningful conclusions.

Plan of the Study :

The plan of the study is as follows:

Chapter II discusses the problems of agriculture production and productivity and use of fertilizer in the Indian context.

Chapter III deals with the utilization of capacity of fertilizer Industry of India both nitrogeneous (N) and phosphorus (P_2O_5) fertilizer 1970 onwards.

Chapter IV analyses the trends of fertilizer production, consumption and their imports of India.

The chapter V highlights the fertilizer policies in the country and to make a critically assessment. It also throw light upon fertilizer industry and protection of fertilizer interests.

Finally, chapter VI offers a summary and the main conclusions of the study with some important suggestions.

C H A P T E R - II

An Appraisal of Agricultural Production, Productivity and Related Problems.

C H A P T E R - II

Agriculture is the oldest and the most widely practicised profession of mankind in the world and it is also a basic and prominant occupation of Indian people. Indian agriculture had been the mainstay since long time and it still occupies the same place. This has to be seen not only in terms of contribution by agriculture sector to the gross domestic produce but also the number of people engaged in agriculture. The role of agriculture sector is almost decisively important in the industrialization of the economy.[1] Important segments of industries in the country are based on agriculture produce like textile industry, sugar industry, small scale industries such as oil mills, Dal mills, backeries, etc. Even after the industrial revolution, agriculture has continued to be the leading occupation dominating the livelihood of nearly two-third of human race.[2]

The Indian economy at the time of independence was not only one of the backward and undeveloped in the world, but it was also stagnant. For almost half a century (1900 - 1946), the long-run population growth rate are 1.1 percent per annum was more or less equal to the long-run growth rate of real

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1. Taylor, Henery, C.: Outlines of Agricultural Economics, New York, The MacMillan Company, 1928, pp.1-13.

2. Dasgupta, Biplab : The New Agrarian Technology and India, The Macmillan Company, 1980, Delhi, pp.42-50.

national income 1.2 percent. Agriculture production was virtually stagnant with a long run growth rate never exceeding 0.3 percent and the population continued to grow faster than food production in the country. The incidence of poverty which was already quite high at the beginning of 20th century, increased even more, and at the time of Independence it was perhaps as high as 75 percent. The overall behaviour of the economy during the first half of the 20th century resembled that of a classical stationary state. It was also suffering from the Nurkesian vicious cycle of poverty ! Low income, low saving and low investment.[3] Agricultural production in India has two major components such as foodgrains and non-foodgrains. The foodgrains production contributes approximately two-third of the total agricultural production. The indices of production assigned are 68.1 and 31.9 percent to foodgrains and non-foodgrains respectively. Indian agriculture has done reasonably well since Independence. But the growth in agricultural production was made possible mainly with an increase in area under cultivation and less due to an increase in the productivity of land and labour (increased in yield). The area under cultivation can be increased either by tne reclaimation of uncultivated or

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3. Bhattacharya, B.B. : Equitable Agricultural growth a must, Yojna, August 1987, p.76.

water-logged and waste lands or through adoption of such practices as double and multiple cropping. But the production was to be enhanced by adopting improved techniques of production and applying improved inputs such as HYV seeds, pesticides, irrigation and more doses of fertilizers, etc.

It was only after the Independence that the planned attempts have been made to bring about agrarian transformation in India, with a view to improving the quality of human life. The policy makers adopted two types of strategy for regenerating agriculture. These strategies are such as Land Reforms to remove the institutional bottlenecks to growth, the second element of national policy was that large investment were undertaken in irrigation, power and other infrastructure.[4] During the mid sixties (60s), the agriculture policy laid main emphasis upon the positive approach towards agricultural prices and increasing use of modern inputs, for the agricultural developments. Under these policies, agriculture had started to play very distinguished role in national economy. It was estimated that agricultural sector contributed fifty-seven (57 percent) of the national income in 1950-51, but it is knew fourty percent (40%) in 1990-91. It is a fact that agricultural sector contributes a substantial part of the national income in India reducing the income ratio

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4. Government of India : First Five Year Plan, July 1951, New Delhi, pp.77-83.

from agriculture and to main agriculture sectors but the problems of low productivity and surplus labor are still persisting in the agriculture sector. The share of agricultural sector in national income is only 2 percent in U.K. 3 percent, in U.S.A. 4 percent,in Canada 5 percent and in Australia 5percent. Hence the share of agriculture in national income in developed countries is very nominal. On the other hand India still far behind these developed countries. Our agriculture is to reach the stage where its contribution in absolute terms should be maximised and in relative terms it is to be minimized through developmental policies.[5]

The 1991 census nearly the 65 percent of the population depending on agricultural sector in India but in U.K. and U.S.A. only 2 - 3 percent, 7 percent in France, 6 percent in Australia, working population is engaged in agricultural sector. Indian agricultural sector play as dominant role to provide employment in the country, more than the developed world.[6] Agricultural and agro-based manufactured products from the bulk of our exports, such as tea, cotton textiles, jutes and jute products, sugar, fruits, spices and so on. Hence in 1990-91 exports of agricultural goods amounted to Rs. 3,736 crores and it was increased to Rs. 4,822 crores in 1991-92 (excluding Marine Products). It

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5. Johl, S.S. : Determination of Agricultural Growth and Development in India (ed.), Dr. Mahajan, V.S., New Delhi, 1986, pp.79-80.

6. Government of India : (i) Census Report - 1991; (ii) Agriculture Statistics, 1991.

means the exports of these products enable us to partly meet our import bill which is rising every year due to increasing world prices and growing import requirements of our own economy.

We come to conclusion from the above discussion that in terms of its scope and size, Indian agriculture is one of the largest in the world after Independence. Sustaining one-sixth of the world's population. With 166 million hectares, India's arable land if occupies third place on the global scene. To note some major indicators, India is the largest producer of jute and second largest producer of sugar cane, third largest producer of rice, fourth largest producer of wheat and cotton and fith biggest producer of rubber. In terms of the value of output, Indian agricultural sector contributes sixty percent of the U.S.A.'s.

Pre-green revolution period which covers the period 1950-51 to 1970-71 with premature green revolution. In the period area under cultivation set the trends with yearly fluctuations (Table 1.1) because of variation in monsoon and weather conditions. Trends of gross area increase under major crops which was quite impressive. During this the main thrust was on introduction of some basic institutional changes and land

reforms vis-a-vis the extention in irrigation infrastructure. The benefits of development were sought to be spread all over the countries through 'community development programmes.' Having weakened power of semifeudal land-lords, and attempt was made to acquaint a large number of owner cultuvators with the better facilities of irrigation.[7]

Land reforms were fairly successful with regard to the objective of abolition of Zamindari and intermediaries in most part of India except in the states like Bihar, Orissa, Rajastan, Madhya Pradesh and West Bengal. Landlords managed to keep very large holdings because of their power and influence. The land distribution was extremely skewed to begin with in early fifties (1953-54). Marginal and small cultivators with less than 2 hectares constitute 60 percent of all cultivating households, but accounted for only 15.4 percent of operated area. By 1981-82, the proportion of marginal and small farmers had increased to 75.3 percent although the area under their cultivation now constitutes 28.1 percent of the total area. Hence the phenomenal increase in the proportion of marginal and small farmers alongwith landless labor in emerging agrarian structure

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7. Prof. Bhalla, G.S. : 'Agrarian Transformation:Interaction between Tradition and Modernity', Yojna, Aug. 15, 1993,p.41.

in India has very serious and significant implications. The gross area under cultivation for foodgrains increased 27.74 percent changed in 1970-71 over 1950-51. Area under irrigation about 19 percent before Independence but despite of various programmes of major and minor irrigation works since 1951 the ratio of irrigated land to total cultivated land has now reached about 36 percent. The period 1971-72 onwards is characterized as with matured post-green revolution, the main emphasis was on increasing yields through the use of modern inputs with more use of fertilizers, and improved methods of production in selected parts of the country through 'Intensive Area Development Programmes.'

In the Table 1.3, the per hectare yield of major crops in post-green revolution period is much impressive as compared to the pre-green revolution period. It is well noted that there was no significant change in the total area under major crops except wheat during the period 1971-72 to 1990-91. The green-revolution was very much confined to wheat in a few North-western states, it was gradually spread to other crops and new areas under the new technology. Further, the introduction of a positive price policy caused and incentive to the farmers with large holdings. Consequently the percentage of marginal

and small farmers increased from 60 percent in 1953-54 to 75.3 percent by 1981-82. With regard to the use of new technology the increasing number of small and marginal farm house-holds did not benefit first due to size of holdings were not viable for application and secondly due to financial constraints of the poorer section of cultivators.

In order to assess the performance of agriculture in India and to exact the impact of new technology. We go through it dividing into two phases ; Pre-Green revolution period and the Post-Green revolution period from 1950-51 to 1970-71 and 1971-72 to 1990-91. Thus we make first the study of the trends in gross are under major crops in Pre-Green revolution and in the Post-Green revolution period.

Pre-Green Revolution And Post-Green Revolution Period:

During this period 1950-51 to 1970-71 as Table 2.1 shows a substantial addition to the land area under cultivation. The rate of the growth of area for food and non-foodgrains both are considerably higher during the pre - rather than the post-green revolution period. While the area under total foodgrains increased by 27.74 percent in 1970-71 over 1950-51, the increase

was 23.7 percent which is less by 3.9 percent in 1990-91 over 1971-72. All the major foodcrops as well as non-foodgrains crops except sugarcane, followed the same trend. Among the foodgrains, the rate of growth of area under wheat crop shows the highest increase of 85.71 percent in 1970-71 over 1950-51. But in 1990-91 over 1971-72 the rate of growth has been only 26.31 percent, 59 percent less during the post in comparison to the pre-green revolution phase. It is the highest decline of the rate of the growth of area among the all major foodgrains crops. Pulses show the lowest decline. In 1970-71 over 1950-51 the area under pulses increased by 18.3 percent and in 1990-91 over 1971-72 by 10.15 percent. Thus the overall decline has been 8.1 percent during the post-green revolution period in comparison to the pre-green revolution period. Among the non-foodgrains, the area under cotton which shows an increase of 32.2 percent in 1970-71 over 1950-51 declined by 5.1 percent in 1990-91 over 1971-72. Hence the overall decline has been 27 percent during the post-green revolution phase. The area under oil seeds shows a lowest decline. It increased by 55.1 percent in 1970-71 over 1950-51 and 50 percent in 1990-91 over 1971-72, only 5.1 percent less in post-green revolution period in comparison to pre-green revolution period. Sugarcane is the

only crop where the area has been increased from 23.5 percent in 1970-71 over 1950-51 to 54.8 percent in 1990-91 over 1971-72. The increase has been 31.2 percent in post-green revolution period over pre-green revolution period.

The technological breakthrough in the late sixties in evolving high yielding varieties, the vast expansion in irrigation and the widespread use of chemical fertilizers provided a great to the green revolution. The above trends indicate that there is very low probability of increase in the area under cultivation. The task is also very costly and time-taking. In India 56 percent of the total area is under cultivation and it is reasonably the world average of 32 percent. But our problem is of different nature. Indian population pressure on land is so high that the per capita availability of land is only 0.40 hectares as compare to 56.62 hectares in Australia, 42.85 hectares in Canada and 8.52 hectares in former USSR.[8] This is absolutely inadequate in relation to our needs. The only hope for India to meet its rising needs for agricultural production. Therefore, the solution lies in raising the level of productivity of land as well as of labor.

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8. Source: Statistical Outline of India 1989-90, FAO Year Book of 1990, Bombay.

Trends of Production and Productivity:

It has been observed from the Table 2.2 that the production and productivity trends of major crops during the pre-green revolution and post-green revolution period the total foodgrains increased from 50.8 million tonnes in 1950-51 to 108.4 million tonnes in 1970-71. During post-green revolution period the total production of foodgrains increased from 105.17 million tonnes in 1971-72 to 176.2 million tonnes in 1990-91. The increase was 67.5 percent in 1990-91 over 1971-72. The overall increase during the post-green revolution period was, therefore, 67.5 percent less than the pre-green revolution period. Hence, among the foodgrains, wheat production shows an impressive improvement during the pre-green revolution in comparison to the post-green revolution period. Production of wheat increased from 6.5 million tonnes in 1950-51 to 23.8 million tonnes in 1970-71. Hence, the increase was 266.1 percent in 1970-71 over 1950-51. Such impressive increase could not be maintained during post-green revolution period. Wheat production was 36.41 million tonnes in 1971-72 which touched the level 54.5 million tonnes 1990-91. Thus, the increase was 106.36 percent in 1990-91 over 1971-72. It means 150.1 percent less than the percentage increase during pre-green revolution period.

Similarly, the production of rice and pulses also show a declining trend. In case of rice, the production was 104.8 percent higher in 1970-71 over 1950-51. It was only 73.20 percent higher in 1990-91 over 1971-72. Production of pulses which was 40.4 percent higher in 1970-71 over 1950-51 remained only 27.2 percent higher in 1990-91 over 1971-72.

Among the non-foodgrains, the production of oil-seeds show a constant increase during both the period. It increased by 84.6 percent in 1970-71 over 1950-51 and further 110.2 percent in 1990-91 over 1971-72; the overall increase was 30.2 percent in post-green revolution period in comparison to pre-green revolution period. The other two major non-foodgrains, namely sugar cane and cotton show a similar declining trend. Production of sugarcane was 121.3 percent higher in 1970-71 over 1950-51. It was only 111.5 percent higher in 1990-91 over 1980-81. Similarly the production of cotton which was 60 percent higher in 1970-71 over 1950-51 came down to 41 percent higher in 1990-91 over 1971-72. The decline was 46.3 percent during post-green revolution phase in comparison to pre-green revolution phase.

These trends clearly show that the rate of growth of all the major food and non-food crops, except oil seeds has been considerably lower during the post-green revolution period in comparison to the pre-green revolution period. Although in absolute terms production shows a constant increase - yet on the basis of the rate of growth, the post-green revolution period indicates a lower rate of growth as against a considerably higher rate of growth during the pre-green revolution period.

A comparative analysis of the change in the gross area under cultivation and the change in the level of output during both phases provide a clear picture in relation to the contribution of the change in acreage crops land on one hand and the change in the output level on the other. It is observed from the Table 2.3 that output area ratio for the total foodgrains improved from 4:1 during pre-green revolution phase to 16:1 during post-green revolution phase. It is pointed out that one percent change in the area leads to 4 percent change in the output in pre-green revolution period and in post-green revolution period one percent change in the area leads to 16 percent change in the output. Rice indicates no change at all. Its ratio remain the same 5:1 during both the periods. Pulses shows a slight improvement and its ratio improves from 2:1 to 2.6 : 1. Wheat has better improvement and its ratio increased

from 3:1 in first phase to 4:1 in second phase. Therefore, one percent change in the acreage crop-land leads to higher percentage change in the output during the post-green revolution period rather than pre-green revolution period. This is mainly because of the application of better techniques and the adoption of improved inputs specially use of fertilizers during the post-green revolution period.[9] Hence, the ratio shows a wide variation among the non-foodgrains. The ratio between the change in the average crop-l and area and the change in the output in oilseeds production has been improved from 1.5 : 1 in the first phase to 2.2 : 1 in the second phase. But the ratio in sugarcane has considerably declined from 5:1 to 9:1 during the same periods. The ratio in cotton also observed a similar trend.

Analysis of Major Crops Yield:

Yield refers to the productivity of land per hectare and the productivity per labor engaged in agricultural production[10] though there is no separate measurement of land and labour productivity had been adopted. The estimates of yield

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9. Fertilizer Association of India : Annual Review of Fertilizer consumption and production 1990-91, New Delhi, p.106.

10. Taylor, Henry, C. : Op.cit., pp.96-100.

per hectare in Table 2.3 presents the same declining trends, while total foodgrains yield per hectare has been 67 percent higher in 1970-71 over the period 1950-51, it is only 61 percent higher in 1990-91 over the period 1971-72. The overall decline, therefore, has been 9.8 percent in post-green revolution period over pre-green revolution period. The per hectare yield of wheat had increased by 97 percent in 1970-71 over the period 1950-51. But it has increased, only, by 65 percent in 1990-91 over the period 1971-72, the increase has been 49 percent less in the post-green revolution in comparison to the pre-green revolution period. Rice and pulses also have the similar trend. The per hectare yield of rice declined from 68 percent to 53 percent and of pulses from 18 percent to 14 percent during first phase and second phase. Among the non-foodgrains, the per hectare yield of sugarcane and cotton highlight the highest downward trends. Oilseed is the only output which shows a substantial improvement. The per hectare yield which was 20 percent higher in 1970-71 over 1950-51 has further increased to 39 percent in 1990-91 over the period 1971-72.

Low Profile of Production And Productivity:

Overall, the absolute measures of changes in agricultural production and productivity as shown in the Table 2.1 and 2.2

gives an impression that during post-green revolution period there has been a substantial improvement in production and productivity of various major crops over the pre-green revolution period. But on the basis of estimating the rate of growth (Table 2.1 to 2.3), it has been examined that the performance of agriculture has not been very much impressive. In post-green revolution period compared pre-green revolution period. It has been pointed out from the above discussion such as,

i) The rate of growth of all major foodgrains and non-foodgrains has been higher during the first phase rather than the second phase. Wheat has shown much stability, its rate of growth has been improved during the second phase in comparison to first phase. Among the non-foodgrains, oil seed has demonstrated much stability and better improvement;

ii) The level of output and productivity despite technological breakthrough, is still quite low, in comparison to another countries;

iii) India, during the Post-Green revolution period, has developed enough potential for increasing production and productivity. Yet the potential has not been

fully utilized. Hence, production and productivity can be enhanced substantially by the effective implementation of the policies.

India will have an estimated 941 million people by the year 1997 A.D. This will increase to 1,102 million by 2007 A.D. With this population and given improvements in consumption levels associated with growth and incomes, the estimated foodgrains requirement for 1997 and 2007 will be around 208 million tonnes and 283 million tonnes respectively. The food grain production has to match this level of demand. The required production levels of foodgrains by 1997 and 2007 are 210 million tonnes and 285 million tonnes respectively.[11] In India, a target of 235-240 million tonnes of foodgrains has been fixed by the Government for 1990-2000 A.D. This will require about 20 million tonnes of fertilizers nutrients.[12]

The Table 2.4 indicates the comparative performance of area, production and yield of selected crops in India vis-a-vis what is being obtained in agriculturally advanced countries.

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11. Government of India : Eight Five Year Plan 1992-97,Planning Commission, New Delhi, pp.30-31.

12. Fertilizer Association of India : Fertilizer Statistics 1991-92, New Delhi, pp. II 67-70.

But it has been observed in detail from the Table that yields Kg. per hectare in India are lower than other countries. Table 2.5 and Table 2.6 gives us more explanation about the national target of foodgrains for future demand, by the increasing population, and Table 2.6 highlight the agricultural perspective in India for 2006 - 07. The year 1991-92 has given us higher production in foodgrains, wheat, coarse cereals, pulses, oilseeds, sugarcane and cotton. This greatly helped in overall economic development of the country. On our production front, there have been given a warning that our population would reach one billion by 21st century. This must concern all citizens and we have to collectively explore and evolve means to face the challenges specially to meet the food, fodder, fuel and fibre demands of the teeming masses.[13] Besides foodgrains, we will have to develop our commercial crops, horticulture, animal husbandary and dairying, fisheries and allied sectors to generate exportable surpluses to earn valuable foreign exchange for substantial development. In other words, per capita consumption of foodgrains was fixed target as 193.6 Kg. in 1996-97 and 225.0 Kg for 2006-07 period in our country.

Majority of population derives its livelihood from agriculture. Agricultural growth and the conditions dominating

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13. For Detail See: Annual Review of Fertilizer Consumption and Production 1992-93

the distribution of its output are ultimately of direct relevance to it. Agriculture is also a significant from the point of view to be proved as a critical constraint on the industrial development and the progress of other sectors if it fails to develop at an appropriate rate and pace. It is the supplier of basic essential wage good, vis food on the one hand and it furnishes raw-material to industry on the other. Therefore, we have another economic dimension of agriculture sector for providing motivations for the industrial expansion through the creation of markets for industrial goods. The low productivity per worker implies that the proportion of output consumed within agriculture itself remains high leaving little surplus for use outside agriculture. The importance of increase in productivity is viewed from the angle that the larger is the proportion of agricultural output not absorbed within agriculture itself, the greater would be market for non-agricultural goods. Agricultural growth could constitute an exogenous source of demand for industry. In the post-green revolution period where the emphasis laid upon HYVs of wheat and rice for cultivation affected very much by the availability of irrigation and more intensive application of fertilizers. However, the success of Green revolution was confined to irrigated reasons and mostly affluent class of farmers. Moreover, the green revolution also helped the

farmers to intensify the cropping alongwith the demand for labour, though the mechanization restricted the application of labour.

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TABLE - 2.1

TRENDS OF GROSS AREA INCREASE UNDER MAJOR CROPS

Crops	Pre-green Revolution Period (m.hectares)			% change in 1970-71 over 1950-51	Post-green Revolution Period (m.hec.			% change in 1990-91 over 71-72	% change in Post over pre-green Revo.Peri
	1950-51	60-61	70-71		71-72	80-81	90-91		
1	2	3	4	5	6	7	8	9	10
Foodgrains	97.3	115.6	124.3	27.74	122.62	126.7	127.5	3.99	- 23.75
Rice	30.8	34.1	37.6	22.07	37.76	40.1	42.6	12.99	- 9.08
Wheat	9.8	12.9	18.2	85.71	19.14	22.3	24.0	26.31	- 59.4
Pulses	19.1	23.6	22.6	18.32	22.15	22.5	24.0	10.15	- 8.17
Oilseeds	10.7	13.8	16.6	55.14	16.03	17.6	24.0	50.0	- 5.14
Sugarcane	1.7	2.4	2.7	23.52	2.39	2.7	3.7	54.8	- 31.28
Cotton	5.9	7.6	7.8	32.20	7.80	7.8	7.4	- 5.12	- 27.08

SOURCE: Economic Survey, 1980-81 & 1991-92, Fertilizer Statistics, 1991-92.

TABLE - 2.2

PRODUCTION TRENDS OF MAJOR CROPS (MILLION TONNES)

Crops	Pre-green Revolution Period(M.hectares)			% change in 1970-71 over 50-51	Post-green Revolution period(M.hectare)			% change in 1990-91 over 1971-72	% change in post over pre-green revolution period
	1950-51	60-61	70-71		1971-72	80-81	90-91		
1	2	3	4	5	6	7	8	9	10
Foodgrains	50.8	82.0	108.4	113.3	105.17	129.6	176.2	67.53	- 67.5
Rice	20.6	34.6	42.2	104.8	43.07	53.6	74.6	73.20	- 42.3
Wheat	6.5	11.0	23.8	266.1	26.41	36.3	54.5	106.36	-150.18
Pulses	8.4	12.7	11.8	40.4	11.09	10.6	14.0	27.27	- 48.14
Oilseeds	5.2	7.0	9.6	84.6	8.75	9.4	18.4	110.2	- 30.2
Sugarcane	57.1	110.0	126.4	121.3	113.63	154.2	240.3	111.5	- 8.8
Cotton	3.0	5.6	4.8	60.0	6.95	7.8	9.8	41.0	- 46.30

Source; Economic Survey, 1980-81, 1990-91, Fertilizer Statistics, 1991-92.

TABLE - 2.3

YIELD PER HECTARE OF MAJOR CROPS (KG/PER HECTARE)

Crops	Pre-green Revolution Period			% change in 1970-71 over 1950-51	Post-green Revolution Period			% change in 1990 over 1971-72	Net % change in Post over pre-green Revo.Period
	1950-51	60-61	70-71		1971-72	80-81	90-91		
Foodgrains	522	710	872	67	858	1023	1382	61	- 9.8
Rice	668	1013	1123	68	1141	1336	1751	53	- 28
Wheat	663	851	1307	97	1380	1630	2274	65	- 49
Pulses	441	539	524	18	501	473	576	14	- 28
Oilseeds	481	507	579	20	546	532	750	39	95
Sugarcane	33	46	48	45	4864	58	65	12	- 258
Cotton	88	125	152	72	151	152	224	48	- 50

* Due to inconsistency of data the base year changed from 1971-72 to 1980-81.

SOURCE: (i) Fertilizer Statistics - 1991-92

(ii) Various Issues of Economic Survey.

TABLE - 2.4

INTERNATIONAL COMPARISON OF AREAS PRODUCTION YIELD OF MAJOR CROPS - 1991.

Crop/Country	Area (in '000 hectares)	Production (in '000 tonnes)	Yield (in Kg/ hectare).
1	2	3	4
WHEAT :			
China	30151	95003	3151
U.S.A.	23347	53915	2309
U.S.S.R.	45976	80000	1740
France	5154	34483	6691
India	23977	54522	2174
PADDY :			
China	33100	187450	5663
Indonesia	10187	44321	4351
India	42200	110945	2629
Japan	2049	12005	5859
MAIZE :			
Indonesia	3009	6409	2130
Yogoslavia	2300	8800	3826
U.S.A.	27859	189867	6815
Italy	857	6208	7239
India	5700	8200	1439
CEREALS :			
Canada	21531	55969	2600
U.S.A.	62058	279923	4511
China	91671	392919	4312
India	102854	195109	1897

Contd...

Table 2.4 contd.

1	2	3	4
PULSES :			
France	702	3294	5052
Australia	1355	1345	1030
U.S.A.	8881	1746	1693
India	24075	14007	559

SOURCE: 1991 "FAO Production Year Book", Vol.45, FAO, Rome.

TABLE - 2.5

ALL INDIA TARGETS OF PRINCIPAL CROPS - 1996-97

Crops	1991-92			1996-97		
	A	P	Y	A	P	Y
1	2	3	4	5	6	7
Rice	42.31	73.66	1741	43.50	88.00	2023
Wheat	22.98	55.09	2397	24.25	66.00	2722
Coarse grains	33.75	26.26	778	37.75	39.00	1033
Pulses	22.57	12.02	534	24.50	17.00	694
All food grains	121.61	167.06	1374	130.00	210.00	1615
Oilseeds	25.42	18.28	719	24.04	23.00	939
Sugarcane	3.78	249.26	65831	3.90	275.00	70513
Cotton*	7.69	9.84	217	7.50	14.00	317
Jute & Mesta**	1.10	10.18	1656	1.00	9.50	1710

NOTE: (i) * - in million bales of 170 Kg. each.
(ii) ** - in million bales of 180 Kg. each.
(iii) A - Area in million hectares.
(iv) P - Production in million hectares.
(v) Y - Yield Kg. per hectare.

SOURCE: 'Eight Five Year Plan' 1992-97, Planning Commission, New Delhi.

TABLE - 2.6

AGRICULTURAL PERSPECTIVE IN INDIA

Variable	1991-92*	1996-97	2001-02	2006-07
1	2	3	4	5
Net sown area (mha)	140.0	141.0	141.0	141.0
Gross cropped area(mha)	182.0	190.6	197.2	203.0
Irrigation (mha)	75.70	89.3	102.0	114.0
Fertilizer (Million tonnes nutrients)	12.73	18.3	23.7	30.0
Cotton (Mill.base)	9.84	14.0	18.0	23.0
Sugarcane (Mill.tonnes)	249.26	275.0	335	408.0
Oil Seeds (Mill.tonnes)	18.28	23.0	29.0	37.0
Foodgrains(Mill.tonnes)	167.06	210.0	245.0	285.0

NOTE: * - Likely.

SOURCE: 'Eight Five Year Plan' 1992-97, Planning Commission, New Delhi, p.32.

C H A P T E R - III

Capacity Utilization in Fertilizer Industry of India Since 1970.

C H A P T E R - III

Fertilizer is an essential ingredient to plant growth and it adds to soil fertility to check plant nutrient deficiencies. At present, fertilizer has become an international commodity among the all crops production inputs that increase world's food supplies. According to the agricultural economists that one tonne of nutrients supplied in fertilizers commodity produces seven to ten tonnes of grains. Basically, the three primary nutrient elements, those are needed for the healthy growth of the plants in order to maximize the agricultural output, are as Nitrogen, Phosphorus, and Potassium. The secondary nutrients are sulpher, calcium, and magnesium. The third group of elements, called micro-nutrients because only few quantities are needed by plants, consists of boron, copper, iron, magnese, molybdenum, zinc and chlorine. Other most important elements such as oxygen, carbon and hydrogen, are supplied by air and water.

The use of chemical fertilizers is still a comparatively recent phenomenon in the long history of agriculture. Until chilean nitrate and peruvian guano were first introduced into

European agriculture in the 1830s, the limited use of artificial fertilizers was confined to such substances as soot, bones, hoofs and horns, saltpetre and lime, etc. The main reliance for the maintenance and restoration of soil fertility was on such practices as shifting cultivation, following crop rotation, catch-cropping (especially with nitrogen fixing legumes) and the recycling of crop and animal residues.[1]

With the abundant supply at relatively low prices of chemical fertilizer possessing the advantages of concentration and portability of adaptability to different soil conditions and to the requirements of different crops, there has been a steady decline in the emphasis on the use of crop and animal residues to return fertility to the soil. In many developing countries especially where there is no tradition of mixed crop and live-stock farming, crop and animal residues have never been much used for fertilization but have been burned as non-commercial fuel. In these countries the modernization of agriculture has sometimes gone straight to the stage of using energy-intensive chemical fertilizers. Major exceptions are China, Japan and Republic of Korea, where although the use of chemical fertilizers has increased rapidly, there is still a

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1. Fertilizer Association of India : "Fertilizer News", May, 1973, New Delhi, p.53.

very substantial use of crop, animal and human residue.[2]

In India the use of chemical fertilizers started at the end of nineteenth century by import of nitrate from Chile. In the beginning the use of chemical fertilizers was mainly confined to the fertilization of tea and coffee plantations. The use of fertilizers in reasonable quantities began in 1920s in tea plantations. In 1930s it spread to sugarcane and rice in some areas. Its use in growing food crops to the significant extent started with the 'GROW MORE FOOD CAMPAIGN' launched after the Bengal Famine of 1942.[3] The use of fertilizers has especially been emphasized through the introduction of fertilizer responsive to high-yielding-varieties of crops in mid-sixties and hence the growth of fertilizer industry too. The main emphasis upon in India are well noted as rapidly increasing consumption and production and large imports of fertilizers to meet the internal requirements. According to the 1956 Industrial Policy Resolution, Government very much emphasized the production of fertilizers establishing the factories in public sectors, private sector, and cooperative sector and their expansion and development in the country.

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2. Fertilizer Association of India : Op.cit., p.53

3. Dr. Sharma, M.L. : "Fertilizer Industry in India : A Financial Appraisal", North Book Centre, New Delhi, p.7.

The first fertilizer produced was Single Super Phosphate (SSP) in 1906 at Ranipat in Tamil Nadu, using powdered bones and sulphuric acid. The plant is still in operation with considerable modifications and expansion, though the use of bones was stopped some years ago and the usual phosphate rock is being used instead.[4]

Generally the application of the three primary nutrients is required namely Nitrogen (N), Phosphorus (P) and Potassium (K) in order to generate the soil fertility so as better crop may be grown. In practice the method of supplying plant nutrients in sufficient amount to the soil is made through chemical fertilizers form a wide-group of materials. According to the nutrient they are classified mainly as:

i) Nitrogen Compounds :

The element nitrogen stimulates the vegetative or leafly, portion of the plant. It is a major component of proteins which are complex organic molecules built up of aminoacid. Nitrogen fertilizers may be classified into four groups on the basis of the chemical contents in which the nitrogen is present therein - such as ammonical and nitrate fertilizers, and amide fertilizers.

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4. Chair, K.S. : "Fertilizer Industry: Can we become self-sufficient ?", Economic Times, 4 June, 1980, p.5

But at present the straight nitrogenous fertilizers produced in India are Urea, Calcium, Ammonium nitrate, Ammonium sulphate, Ammonium chloride and Ammonium sulphate nitrate. It is estimated that a tonne of wheat requires approximately 50 pounds or 23 K.G. of nitrogen essential to be converted into protein.

ii) Phosphorus Compounds :

The element phosphorus, an essential part of protoplasm greatly stimulates plant growth, especially of the roots. It increases the development of the re-productive parts of plants, such as seeds, and it hastens maturity or ripening. The fertilizer industry refers to phosphorus as the oxide, P_2O_5, and calls it phosphate. Phosphatic compounds are classified into three groups according to the forms in which the phosphorus compounds are present. There are Single Super Phosphate (SSP), Triple Super Phosphate (TSP), Dicalcium Phosphate, Rawbone meal, steamed meal and rock phosphate.

iii) Potassium Compounds :

Potassium is third element supplied in great amounts in fertilizers. Its function in the growth of plants is associated with the synthesis of their foods, such as starches. Although these foods do not contain potassium compounds such as,

potassium starvation reduces the vigor of the plant, making it more susceptable to attack by parasites. Potassium that is often called the "Policeman element", is found largely in the vegetative portion of the plant. Crops grown their vegetative parts, such as tobacco, remove large amounts of potassium from a soil. Agriculture economists estimated as an acre yielding 4 tonnes of alfalfa consumes 59 K.g (130 pounds) of potash. The potassium contents of potassic fertilizers are expressed interms of potassium oxide (K_2O) or 'Potash.'

Potash is obtain from mining and purification of natural deposts containing potassium salt which occur in various countries, such as in France, Germany, Canada, USA and Former USSR. The two potassic fertilizers commonly in use in India are Potassium chloride and Potassium Sulphate.

Capacity Utilization of Nitrogenous Fertilizers Industry in India :

It has been understood highly important to study the production of fertilizers and productive capacity and its utilization in the country. Therefore the available statistics relating to the capacity utilization, production and installed capacity of nitrogenous fertilizer from 1970-71 to 1992-93 is

presented in Table 3.1. It may be observed from the table that the capacity utilization of nitrogenous fertilizer was only to the extent of 61.6 percent. The installed capacity was estimated to produce 1,349 thousand tonnes but only 832 thousand tonnes of production of nitrogenous fertilizers took place in 1970-71. On the other hand in 1972-73 the production of nitrogenous fertilizer was increased to 1,054 thousand tonnes with a high level of capacity utilization of 71.6 percent against the installed capacity of nitrogenous fertilizer to produce 1,471 thousand tonnes even though it was lower than what it was in the previous year i.e., 1971-72. From 1974-75 onwards, progress was made with gradually in the sphere of capacity utilization and it reached the level of 66.3 percent by 1978-79. By the end of the decade i.e., 1979-80 the production of nitrogenous fertilizers was 2,224 thousand tonnes while the installed capacity was 3,902 thousand tonnes with only 56.9 percent of capacity utilization in nitrogenous fertilizers which was declined than previous year. During the next decade i.e., between 1980-90 the capacity utilization of nitrogenous fertilizers was varied from year to year. In 1980-81,the production of nitrogenous fertilizers was 2,164 thousand tonnes while the installed capacity was 4,586 thousand tonnes with only 47.1 percent of capacity utilization in

nitrogenous fertilizers which was less than the ending year of the first decade. But after this year it was increased a high level of 70 percent of capacity utilization in the year 1984-85. Again it was decreased 5.5 percent in the year 1985-86. From 1985-86 to 1989-90 the capacity utilization was achieved a remarkable progress a level of 82.8 percent in the decade ending on 1989-90. The latest situation has significantly improved point of view from the capacity utilization production of nitrogenous was 6,993 thousand tonnes, 7,301 thousand tonnes and 7,431 thousand tonnes while the installed capacity was 8,147 thousand tonnes, 8,229 thousand tonnes and 8,515 thousand tonnes at the high level of 85.8 percent, 88.7 percent and 87.2 percent of capacity utilization of nitrogenous fertilizers in the year 1990-91 to 1992-93 respectively in India.

Hence the average performance of the nitrogenous fertilizer industry can better be presented such that during the one decade i.e., from 1970-71 to 1989-90 the production, installed capacity of nitrogenous fertilizers reveal that while the installed capacity was 2,432.4 thousand tonnes with 61.19 percent of capacity utilization in nitrogenous fertilizers which were made a considerable progress during the second decade i.e., from 1980-81 to 1989-90 the annual average of production was

4,480.5 thousand tonnes while the capacity was increased to 6,222.4 thousand tonnes with the higher level of 70.23 percent of capacity utilization in nitrogenous fertilizers. During 23 years i.e., from 1970-71 to 1992-93 the overall annual average of production was 3,537.6 thousand tonnes while the capacity was 4,845.17 thousand tonnes with the level of 68.51 percent of capacity utilization in nitrogenous fertilizers in Indian fertilizer industry. This indicates that even though the installed capacity has increased significantly during the entire period of study, capacity utilization is still to be improved in the nitrogenous fertilizer industry.

Capacity Utilization of Phosphatic Fertilizer Industry in India :

The analysis for the phosphatic fertilizer capacity, production and capacity utilization has been made with help of the figures presented in Table 3.1. It has been examined from the table that the level of capacity utilization increased from 52.6 percent to 65.7 percent in 1972-73. It was declined 60.6 percent to 43.4 percent from 1973-74 to 1975-76. Again capacity utilization of phosphatic fertilizers increased a level of 51.5 percent to 69.6 percent during the i.e., from 1976-77 to 1978-79. In the year 1978-79 capacity utilization

was increased 13.5 percent. By the end of this decade i.e. 1979-80 the capacity utilization in phosphatic fertilizers decreased a level of 59.2 percent. During the second decade i.e., from 1980-81 to 1989-90 there was a significant increase in the capacity utilization of phosphatic fertilizer in the first five years, from 63.2 percent to 74.5 percent as the corresponding year i.e., from 1980-81 to 1984-85. In the year 1985-86 capacity utilization was slightly declined to 73.2 percent as compare to the previous year and again it was stood up to 75 percent in the year 1986-87. Capacity utilization in the next year only 6.2 percent decreased in 1987-88. By the end of the second decade that is 1989-90 it was 67.8 percent at declining rate. In the current year from 1990-91 to 1992-93 capacity utilization of phosphatic fertilizers was 74.1 percent, 93 percent and 82.5 percent respectively. Hence, in the case phosphatic fertilizers, the annual average in the two decades, i.e., from 1970-71 to 1979-80 and from 1980-81 to 1989-90, the production installed capacity and capacity utilization indicate that while installed capacity increased from 792.5 thousand tonnes to 1,968.5 thousand tonnes, the production increased from 451.2 thousand tonnes to 1,346.1 thousand tonnes and capacity utilization was also increased from 56.28 percent to 70.03 percent during the same decade years i.e. from 1970-71 to 1979-80 and 1980-81 to 1989-90.

The capacity utilization of phosphatic fertilizers in Indian fertilizer industry during more than two decades i.e., from 1970-71 to 1992-93, the annual average indicates that while installed capacity, production and capacity utilization was a level to 1,562.69 thousand tonnes, 1,104.65 thousand tonnes and 65.76 percent as respectively. This reveals that there is need for improving capacity utilization in respect of phosphatic fertilizers also.

Thus, it may be concluded that the production levels of both nitrogenous and phosphatic fertilizers in India lagging behind the available plant capacity level. So there is urgent need for improving the capacity utilization in the fertilizer industry in India for meeting the growing demand from both nitrogenous and phosphatic fertilizers.

Factors Affecting Capacity Utilization of Fertilizer Industry in India :

The capacity utilization of fertilizers industry in India which plays a significant role in supplying fertilizers to the farmers has stagnant around 66 percent inspite of impressive additions to capacity over years. Hence, a low capacity utilization in India fertilizer industry has become

a matter of considerable concern, particularly when low production means larger imports entailing higher inflow of foreign exchange. It is pointed out that an improvement of an additional 10 percent of capacity utilization can produce 15 lakh tonnes more of fertilizers which would correspond to a saving of foreign exchange of more than Rs. 300 crores per year.[5] Further, low level of operation in factories also increases the cost of production of fertilizers. High costs and inadequate availability of fertilizers would finally result in lower agricultural production adversely affecting the interest not only of farmers but also of consumers, particularly those belonging to the pauperized sections of the society. Hence, the problem of capacity utilization in fertilizer industry in India is highly sensitive to the cultivators for supplying the agricultural commodities on remunerative prices, the consumers in buying food articles and the government to introduce the fiscal measures. The industry would run at maximum possible capacity to achieve these goals.[6]

In this chapter the analysis of factors affecting the capacity utilization of both nitrogenous and phosphatic fertilizer industry has been made to assess its performance. The

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5. Ramanathan, S. : FAI Seminar 1982 on Fertilizer Productivity and Advances in Technology;Proceedings of the Seminar, Part I March 1983, New Delhi.

6. Ramanathan, K.V. : "Fertilizer Demand and Supply Situation: India", Proceedings of FAI Seminar 1979 on Critical Areas Affecting Fertilizer Consumption in India, March 1980, New Delhi, P.I-2 (I), 1 to 9.

data available on the causes of nutrient-wise loss of production presented in Table 3.2 and Table 3.3. It has been noted that the major causes for loss of production are as following as per table :

1- Power problems;

2- Shortage of supply of raw-materials;

3- Equipment problems;

4- Labour problems; and

5- Others, such as

i) Commissioning problems,

ii) Unforeseen breakdowns, and

iii) Process problems, etc.

1. Power Problems :

Power cuts were the one of the major factors which adversely affected production during 1979-80 to 1990-91. Production loss of nitrogenous fertilizers was 23.3 percent, 12.4 percent, 17.5 percent, 27.0 percent and 28 percent respectively in 1979-80, 1980-81, 1981-82, 1982-83 and 1983-84. It may be observed that loss of nitrogenous fertilizer was decreased from 16.1 percent to 7.3 percent in the corresponding years i.e., from 1984-85 to 1989-90. Again it was

increased by 13.6 percent loss of nitrogenous fertilizers production in 1990-91 (Table 3.2). Next to power problems for the loss of phosphatic fertilizers in Table 3.3 was fluctuated during the year 1979-80 to 1990-91 as 15.1 percent, 2.6 percent, 4.7 percent respectively was noted. In this case during 1982-83 and 1983-84 it was further increased to 25 percent and 23 percent respectively in the corresponding years. It has been marked that there were severe power and water problems which adversely affected production both nitrogenous and phosphatic fertilizers at Madras and Talcher because these plants were shutdown mainly due to power and water shortage during that period.[7] During 1985-87 power problems affected FCI-Gorakhpur, HFC-Namrup, HFC-Barauni and Durgapur, SAIL-Rourkela and IEL-Kanpur.[8] Thus the above analysis reveal that loss of production of both nitrogenous and phosphatic fertilizers was due to power cut and water problems in the Indian fertilizer industry since 1979-80.

2. Shortage of Raw-materials :

Shortage of raw-materials also hit production of both nitrogenous and phosphatic fertilizers adversely in several

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7. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1983-84, New Delhi, p.100.

8. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1986-87, New Delhi.

plants. The share of loss of production of nitrogenous fertilizers on account of inadequate supply and untimely delivery raw-materials mainly was 24.6 percent, 46.3 percent, 22 percent, 31.7 percent and 21.6 percent respectively in the year as 1979-80, 1980-81, 1982-83, 1989-90 and 1990-91. On the other hand, production loss in phosphatic fertilizers due to shortage of raw materials worked out to be 38 percent, 68.3 percent, 284.8 percent, 597.1 percent and 200.4 percent respectively years as 1979-80, 1986-87, 1987-88, 1989-90, and 1990-91. From the above study, it was found that phosphatic fertilizers were curtailed absolutely more than the fall in nitrogenous fertilizers. The short supply of naphtha with high arromatic content mainly affected production at IEL-Kanpur and IFFCO-Phulpur, high sulphur values in naphtha affected production at SFC-Kota and GSFC and oil contaminated naphtha affected production at MFL. Limitation in gas supply at GSFC and fluctuations in compositions of associated gas had been the factor to affect production at Trombay V. Conversely, inadequate supply of coal affected SFC-Kota and sub-standard quality of coal adversely affected production in GNFC and NFL plants. Phosphatic fertilizers production was affected at several plants due to some limitations in availability of adequate quantities of sulphur. The importation of quantitative sulphur from Iraq also created problems in sulphuric acid plants at FACT.[9]

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9. For details see : Various Issues of FAI, Annual Review of Fertilizer Consumption and Production, 1979-80 to 1990-91, New Delhi.

3. Equipment Problems :

It is the single biggest factor responsible for loss of production of nitrogenous and phosphatic fertilizers in Indian fertilizer industry. During the entire period from 1979-80 to 1990-91 production was adversely affected due to equipment breakdown in both fertilizers industries. The percentage loss of nitrogenous and phosphatic fertilizers was fluctuated year to year as shown in Table 3.2 and 3.3. Hence it is obvious that problems relating to failure of equipment were mainly due to design deficiencies and ageing of plants due to vintage. The irregular and sub-standard quality of power supply resulting in frequent tripping of plants also caused severe damages to equipment. The major equipment problems were experienced with compressor, turbines, high pressure pumps, heat exchangers, reaction vessels, etc. Because of serious problems in oxygen compressors, commissioning of Haldia was further delayed.[10] Equipment breakdown problems were mainly faced in Ramagundam, Namrup, Durgapur, Barauni, Cochin-I, Trombay V, Phulpur, Kanpur, Tuticorin, Manglore plants and Sindri Modernisation.[11] Therefore, nitrogenous and phosphatic fertilizers production were hit in major industries as mentioned above due to equipment breakdown of compressors, turbines and heat exchangers mostly.

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10. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1983-84, New Delhi,p.102.

11. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1987-88, New Delhi,p.73.

4. Labour Problems :

Labour inspite of being most important factor of production serving in fertilizer industry did not seem to raise so much as by raw-materials, power and equipment breakdown factors both in nitrogenous and phosphatic fertilizers production. It may be observed from the Table 3.2 and Table 3.3 that loss of production in nitrogenous and phosphatic fertilizers were relatively high in some years due to labour problems. The maximum loss of nitrogenous fertilizer reached the level 18.5 percent in 1980-81 while for phosphatic fertilizers it was noted 34.3 percent in 1980-81. In 1990-91 some labour problems were experienced by Paradeep and EID, Parry, Ennore plants.[12]

5. Other Problems :

Nitrogenous and Phosphatic fertilizers were also affected by other unspecified factors such as commissioning problems, unforeseen breakdown and process problems, etc. The loss of nitrogenous fertilizer was accounted for 21.1 percent, 26.3 percent, 35.5 percent, 36 percent and 32 percent in the year 1979-80, 1981-82, 1985-86, 1986-87 and 1987-88 respectively at high level production of phosphatic fertilizers was also adversely affected due to other problems reached at high level

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12. For Details see : Annual Review of Fertilizer Consumption and Production, 1990-91, FAI, New Delhi.

to 38.5 percent in 1981-82, 43.2 percent in 1984-85 and 57.2 percent in 1985-86. The non-payment of outstanding subsidy dues caused severe liquidity problems. Single Super Phosphate industry, in particular, suffered acute shortage of funds and consequent production loss, during 1992-93.

The above analysis reveals that in the case of both nitrogenous and phosphatic fertilizers, loss of production in Indian fertilizer industry was mainly due to equipment problems followed by raw-material shortages. Loss of production is also considerably high in both the nutrients due to power cuts and other related factors to the fertilizer industry.

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TABLE - 3.1

ALL INDIA CAPACITY AND PRODUCTION OF NITROGENOUS AND PHOSPHATIC FERTILIZER SINCE 1970.

('000 Tonnes)

Years	Capacity*	Production		Un-utilized Capacity		Capacity	Production		Un-utilized Capacity	
		Total	Capacity Utilization %	Total	%		Total	Capacity Utilization %	Total	%
1970-71	1349	832	61.6	517	38.4	433	228	52.6	205	47.4
1971-72	1515	949	62.6	566	37.4	532	290	54.5	242	45.5
1972-73	1471	1054	71.6	417	28.4	502	330	65.7	172	34.3
1973-74	1933	1050	54.3	883	45.7	534	324	60.6	210	39.4
1974-75	2162	1187	54.9	975	45.1	666	331	49.6	335	50.4
1975-76	2625	1508	57.4	1117	42.6	737	320	43.4	417	56.6
1976-77	3024	1862	61.5	1162	38.5	927	478	51.5	449	48.5
1977-78	3069	1991	64.8	1078	35.2	1193	670	56.1	523	43.9
1978-79	3274	2173	66.3	1101	33.7	1117	778	69.6	339	30.4
1979-80	3902	2224	56.9	1678	43.1	1287	763	59.2	524	40.8
1980-81	4586	2164	47.1	2422	52.9	1330	841	63.2	489	36.8
1981-82	4719	3143	66.6	1576	33.4	1469	950	64.6	519	35.4
1982-83	5174	3430	66.2	1744	33.8	1492	984	65.9	508	34.1
1983-84	5200	3491	67.1	1709	32.9	1614	1064	65.9	550	34.1
1984-85	5592	3917	70.0	1675	30.0	1768	1318	74.5	450	25.5
1985-86	6695	4323	64.5	2372	35.5	1952	1430	73.2	522	26.8
1986-87	6880	5412	78.6	1468	21.4	2214	1662	75.0	549	25.0
1987-88	7083	5465	77.1	1618	22.9	2453	1665	67.8	788	32.2
1988-89	8148	6712	82.3	1436	17.7	2666	2252	84.4	414	15.6
1989-90	8147	6747	82.8	1400	17.2	2727	1795	65.8	932	34.2
1990-91	8147	6993	85.8	1154	14.2	2765	2051	74.1	714	25.9
1991-92	8229	7301	88.7	928	11.3	2753	2562	93.0	191	7.0
1992-93	8515	7431	87.2	1084	12.8	2811	2321	82.5	490	17.5
Annual Average:										
1970-71 to 1979-80	2432.4	1483.5	61.19	949.4	38.81	792.5	451.2	56.28	341.6	43.72
1980-81 to 1989-90	6222.4	4480.5	70.23	1742.0	29.77	1968.5	1346.1	70.03	572.1	29.97
1970-71 to 1992-93	4845.17	3537.6	68.51	1307.83	31.48	1562.69	1104.65	65.76	457.91	34.23

NOTE: 1. * = Capacity as at the end of the year viz., 31st March of Plants in operation.

SOURCE: FAI, Various Issues of Fertilizer Statistics And Fertilizer News, New Delhi.

T A B L E - 3.2

LOSS OF PRODUCTION OF NITROGENOUS FERTILIZER FACTOR - WISE

Reasons	1979-80		1980-81		1981-82		1982-83		1983-84		1984-85	
	Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production	
	Loss in '000 MT	Loss in %Change	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss in % Change	Loss in '000MT	Loss in % change
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Power Problems	161.0	23.3	93.0	12.4	73.6	17.5	160.0	27.0	245.9	28.0	84.9	16.1
2. Shortage of raw materials	170.0	24.6	349.0	46.3	24.4	5.8	14.7	22.0	38.2	4.6	11.2	2.1
3. Equipment Breakdown	211.9	30.7	172.0	22.8	201.9	48.0	349.8	58.0	421.6	49.0	317.2	60.2
4. Labour Problems	2.0	0.3	139.0	18.5	10.1	2.4	62.9	10.0	3.2	0.4	12.7	2.4
5. Others	145.0	21.1	-	-	110.5	26.3	12.4	3.0	155.2	18.0	101.2	19.2
Total Loss of Production	689.9	100.0	753.0	100.0	420.5	100.0	699.8	120.0	864.1	100.0	527.2	100.00
Total Production	2224.0		2164.0		3143.0		3430.0		3491.0		3917.0	
Percentage Loss of total Production	31.02		34.79		13.36		20.40		24.74		13.45	

Contd....

Table - 3.2 contd.

Reasons	1985-86		1986-87		1987-88		1989-90		1990-91	
	Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production	
	Loss in '000MT	Loss in % change	Loss in '000 MT	Loss in % change	Loss in '000 MT	Loss in % change	Loss in '000 MT	Loss in % change	Loss in '000 MT	Loss in % change
1	14	15	16	17	18	19	20	21	22	23
1. Power Problems	88.3	12.5	77.9	13.0	107.8	11.2	85.0	7.8	114.9	13.6
2. Shortage of raw-materials	17.5	2.5	22.1	8.7	173.3	17.9	347.3	31.7	208.4	24.6
3. Equipment breakdown	333.9	47.4	246.7	41.2	323.7	33.4	527.8	48.1	330.6	39.1
4. Labour Problems	15.0	2.1	6.7	1.1	54.2	5.5	13.5	1.2	23.3	2.8
5. Others	249.4	35.5	215.3	36.0	309.8	32.0	123.0	11.2	168.5	19.9
Total Loss of Production	704.1	100.0	568.7	100.0	968.8	100.0	1096.6	100.0	845.7	100.0
Total Production	4323		5412		5465		6747		6993	
Percentage Loss of total Production	16.28		10.51		17.73		16.25		12.09	

SOURCE: Various Issues of Annual Review of Fertilizer Consumption And Production, FAI, New Delhi.

TABLE - 3.3

LOSS OF PRODUCTION OF PHOSPHATIC FERTILIZER FACTOR-WISE

(000 Tonnes)

REASONS	1979-80		1980-81		1981-82		1982-83		1983-84		1984-85		1985-86	
	Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production		Loss in Production	
	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss in % Change	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss in %Change	Loss in '000 MT	Loss in %Change	Loss in '000MT	Loss in %Change	Loss in '000MT	Loss %Char
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Power Problems	11.0	15.1	12.3	14.7	3.6	9.4	32.4	25.0	37.4	23.0	2.9	6.5	2.6	2.6
2. Shortage of raw materials	38.0	52.0	11.6	13.9	5.6	14.6	8.1	6.0	16.4	10.0	5.4	12.0	2.8	2.8
3. Equipment breakdown	24.0	32.9	31.0	37.1	13.6	35.4	63.7	48.0	50.6	32.0	15.2	33.9	26.6	26.8
4. Labour Problems	-	-	28.6	34.3	0.8	2.1	7.3	5.0	4.0	2.0	2.0	4.4	10.5	10.6
5. Others	-	-	-	-	14.8	38.5	20.5	16.0	52.9	33.0	19.4	43.2	56.6	57.2
Total Loss of Production	73.0	100.0	83.5	100.0	38.4	100.0	132.0	100.0	161.3	100.0	44.9	100.0	99.1	100.0
Total Production	763		841		950		984		1064		1318		1430	
Percentage loss of Total Production	9.56		9.98		4.00		13.41		15.13		3.41		6.92	

Contd....

Table : 3.3 continued

REASONS	1986-87		1987-88		1989-90		1990-91	
	Loss in Production		Loss in Production		Loss in Production		Loss in Production	
	Loss in '000 MT	Loss in %Change	Loss in '000 MT	Loss in %Change	Loss in '000 MT	Loss in %Change	Loss in '000 MT	Loss in %Change
1. Power Problems	13.4	4.7	22.9	4.0	10.3	1.4	4.2	1.3
2. Shortage of raw materials	68.3	23.7	284.8	50.0	597.1	81.1	200.4	61.2
3. Equipment break down	31.6	11.0	29.6	5.2	22.3	3.0	31.0	9.5
4. Labour Problems	8.0	2.8	36.6	6.4	40.9	5.6	57.0	17.4
5. Others	166.4	57.8	196.1	34.4	65.5	8.9	35.1	10.6
Total Loss of Production	287.7	100.0	570.0	100.0	736.1	100.0	327.7	100.0
Total Production	1662		1665		1795		2051	
Percentage loss of Total Production	17.32		34.23		41.00		15.99	

SOURCE: Various Issues of Annual Review of Consumption And Production, FAI, New Delhi.

C H A P T E R - IV

Production of Fertilizers, their imports and Consumption Since - 1970.

C H A P T E R - IV

In India we depend mainly on three fertilizer nutrients, viz., nitrogen, phosphorus and potassic fertilizers. So far as the supply of these fertilizers (NPK) is concerned it has hardly been made to meet the farmers demand adequately. To meet this gap country made huge quantity of imports of NPK fertilizers from international market on higher price which creates the scarcity of foreign exchange. Only indigenous raw-materials are available mainly for nitrogen. In the case of phosphorus, however, internally non-availability of raw-materials has been the main constraint on production of fertilizers and failed to meet the domestic demand. The potassic fertilizers are not produced in India, mainly due to the non-availability of raw materials for their production. Therefore we have always been dependent to acquire these particular fertilizers on the foreign market. In meeting the demand for potassic fertilizers their imports are restricted due to foreign exchange problem. In general they have always been in short supply. Fertilizers are the major agriculture input that has, over the period, contributed significantly to the agricultural production. The majority of population is still engaged in agriculture for their livelihood and it is not very much developed. The attempts are made to have the

commercialization of farm business, so that farmers may fully participate in the economic development in the country. The Government of India has the primary aim of making the fertilizer available in open market for the farmer to meet their demand.

In the light of our observations in the preceding chapter, a review of India's performance in the availability of fertilizers is very essential. The present chapter throws the light on the same aspect since 1970. More precisely an attempt is made in this chapter to analyse and evaluate the performance of nutrient-wise consumption/demand, production/supply, and imports of complex fertilizers (NPK) during the period of about a quarter century since 1970-71 to 1992-93. Table 4.1 outline the trends of fertilizer consumption, table 4.2 highlights the trends of fertilizer production, table 4.3 speaks of the trends of fertilizer imports, and table 4.4 has been constructed to assess the total picture of consumption, production, gap between production and consumption, and imports of NPK fertilizers since 1970.

Nutrient-wise Consumption of Fertilizer :

India has achieved tremendous progress in raising fertilizer consumption as nutrient-wise from 1970-71 to 1992-93 is given in Table 4.1. The table shows that the use of chemical fertilizers in the country has shown a sharp increase during this period. Traditionally our domestic consumption of nitrogen (N) fertilizers was only 55 thousands tonnes, phosphorus (P) 8.8 thousand tonnes, and Potassic (K) 6.0 thousand tonnes in 1950-51 and total consumption of complex fertilizers (NPK) was 69.6 thousand tonnes. But it was increased to 1479 thousand tonnes for nitrogen, 541 thousand tonnes for phosphorus, 236 thousand tonnes for Potassic and total NPK 2257 thousand tonnes in 1970-71.[1] Then after bearing a setback in the year 1974-75, nutrient consumption again increased. The consumption in 1979-80 went upto nitrogen 3498 thousand tonnes, phosphorus 1151 thousand tonnes, potassic 606 thousand tonnes and total NPK 5255 thousand tonnes which crossed 12000 thousand tonnes NPK in 1992-93. Table 4.1 presents the percentage increase/ decrease in the annual consumption and it evinces increasing habits to use fertilizers in greater and greater amount.

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1. Data source : Fertilizer Statistics 1992-93, FAI, New Delhi, p. I-90.

Only the year 1974-75 and 1992-93 consumption was in negative i.e. - 9.36 percent and - 3.76 percent respectively. Sometimes consumption increased or decreased there are so many factors behind this but the most important factors is weather. Favourable weather condition is in the year as 1974, 1992 and other where weather is poor or average i.e. 1972, 1979, 1986, 1987 and 1991, etc. Overall the performance of fertilizer consumption is better as compare to the previous or before 1970.

Nitrogen annual average of the period from 1970-71 to 1979-80 was 2314.7thousand tonnes to increase 5439.2 thousand tonnes in the span of the same years from 1980-81 to 1989-90. Phosphorus has been mark satisfactory progress with 1959.4 thousand tonnes in 1980-81 to 1989-90 as compare to 705.7 thousand tonnes in 1970-71 to 1979-80 and potassic has better performance 841.3 thousand tonnes in 1980-81 to 1989-90 than previous year 1970-71 to 1979-80 as 388.1 thousand tonnes. The total annual average in 23 years are as 4435.52 thousand tonnes for nitrogen fertilizer, 1740.69 thousand tonnes for phosphorus fertilizer and 692.43 thousand tonnes potassic fertilizer consumption during the period 1970-71 to 1992-93.

Hence, annual average of total complex fertilizers reveals towards better improvement as decade-wise. 1980-81 to 1989-90 shows remarkable progress 8239.9 thousand tonnes as compare to 3408.5 thousand tonnes in 1970-71 to 1979-80. In 23 years annual average is 6652.47 thousand tonnes during the period 1970-71 to 1992-93.

During the entire period of study a drop in absolute consumption of fertilizers was noticed only twice i.e. in 1974-75 and 1992-93. This was primarily on account of world-wise shortage in production and extra-ordinary increase in their prices. However, the Government of India took encouraging and pragmatic measures, some of which are as follows.[2]

i) Reduction in prices of fertilizers in two spells during 1975;

ii) Relaxation of physical controls;

iii) Narrowing down during 1976 of the gap between unit prices of different nutrients by reducing the excise duty on SSP by 50 percent, introduction of a price subsidy of Rs.1,250 per tonnes of P_2O_5 on indigenous phosphates and reduction on the pool issue prices of potash and urea by Rs.185 and Rs.100 per tonne, respectively;

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2. Fertilizer Association of India : Annual View of Fertilizer Consumption and Production 1979-80, Fertilizer News, July 1980, New Delhi, p.2

iv) Introduction of Intensive Fertilizer Promotion Campaign by Government of India with the close co-operation of State Governments and the Industry during Kharif 1976 in 55 identified irrigated districts with low actual fertilizer consumption but high potential for consumption; and

v) Accelerated increase in irrigated area and areaa under HYV crops. As a result of these measures consumption again showed a significant rise.

We had a setback in consumption of total nutrient NPK in 1992-93 entirely, due to a cut in the consumption of P_2O_5 and K_2O. The important factors which have been respnsibile for it are as follows:[3]

(i) The year 1992-93 has a better year weatherwise and favourable price of straight nitrogen fertilizers with reduction in the price of uear by 10 percent, but the dismal performance of fertilizer consumption was mainly due to sudden decontrol of phosphatic and potassic fertilizers in a bed to reduce fertilizer subsidy on domestic fertilizer, all were to effective from 25th Aug. 1992. This was followed with the consumption.

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3. Fertilizer Association of India : Annual Review of Fertilizer consumption and production 1992-93, Sep. 1993, New Delhi, p.6S.

(ii) There was no shortage of feedstock, raw materials and intermediates during 1992-93. Only the effecting was decontrol of complex fertilizers.

Nutrient-wise Production of Fertilizer:

India is producing only Nitrogen and Phosphorous fertilizers to meet her demand. Potassic fertilizer is entirely met through import. Table 4.2 shows the progress of Indian fertilizers production from 1970-71 as nutrient-wise production of nitrogen and production.Nitrogen fertilizer production was 30 thousand tonnes in 1951-52, increased to 731 thousand tonnes in 1969-70. Phosphorus fertilizer production increased to 224 thousand tonnes as compare to 10 thousand tonnes in 1951-52. The total production of fertilizers(NP) increased to 954 thousand tonnes in 1969-70 as compare to 40 thousand tonnes in 1951-52.[4] The statistical information relating to the production of nitrogen and phosphorus fertilizer is presented in Table 4.2 and observed from the table that the production increased progressively yearly. The production of nitrogen fertilizers was increased 2220 thousand tonnes in 1979-80 as compare to 832 thousand tonnes in 1970-71. One

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4. Data source : Fertilizer Statistics 1992-93, FAI, New Delhi, P.I - 140.

decade annual average of nitrogen fertilizer production was 1483.5 thousand tonnes as it is indicated that nitrogen fertilizer production has been noted as 832, 949, 1054, 1050, 1187, 1508, 1862, 2000, 2173 and 2220 thousand tonnes respectively from 1970-71 to 1979-80.

By the end of second decade i.e., 1989-90, production of nitrogen fertilizer progress was made to a high level of 6747 thousand tonnes in comparison to 2164 thousand tonnes in 1980-81. During this period annual average production was 4480.5 thousand tonnes as known nitrogen fertilizer production growth in absolute terms have been given as 3430, 3491, 3917, 4323, 5412, 5466, 6712 and 6747 thousand tonnes respectively from 1980-81 to 1989-90. Again, it may be seen from the Table that the production level was increased as 6993, 7301 and 7431 thousand tonnes in the year 1990-91, 1991-92 and 1992-93 respectively. Hence, the total annual average of nitrogen fertilizers production is 3537.6 thousand tonnes in 23 years from 1970-71 to 1992-93.

Production of Phosphorus fertilizer was noted a remarkable progress from the table that was increased from 228 thousand tonnes to 763 thousand tonnes during the year from

1970-71 to 1979-80 except three years as 1973-74, 1975-76 and 1979-80. Annual average of phosphorus fertilizer production over a decade was 451.2 thousand tonnes and production growth has been made as 228, 290, 330, 324, 331, 320, 478, 670, 778 and 763 thousand tonnes. In three years production was declined only due to shortage of DAP. During the second decade production of P_2O_5 again increased 841 thousand tonnes in 1980-81 to 1795 thousand tonnes in the year 1989-90. Only in 1989-90 production of phosphorus was declined as compare to previous year 1988-89 i.e. 2252 thousand tonnes. In this period, annual average growth was calculated 1396.1 thousand tonnes and growth in absolute terms have been given as 841, 950, 984, 1064, 1318, 1430, 1662, 1665, 2252 and 1795 thousand tonnes respectively. In the recent years production of phospohorus continuously increases from 2051 in 1990-91 to 2562 thousand tonnes in 1991-92, only the provisional figure for 1992-93 shows declining trend as the level of 2321 thousand tonnes. The total annual average production of phosphorus fertilizer is recorded 1104.65 thousand tonnes during the period of 23 years i.e. from 1970-71 to 1992-93

In this way, overall the production of phosphorus fertilizer shows a declining trend only in the year 1989-90

and 1992-93 i.e. 57 and 241 thousand tonnes respectively. The factors which are responsible to decline P_2O_5 production are as following.[5]

i) the stocks started mounting which, in turn, compelled the manufacturers to slow down production of phosphorus;

ii) production of DAP (18-46-0) was the worst hit which, before, decontrol, accounted for nearly 50 percent of P_2O_5 production and 60-65 percent of P_2O_5 consumption. It means price of DAP in international market was high, so DAP was imported in lower quantity in this year 1989-90 and 1992-93.

It may be seen from the table that the total production of nitrogen and phosphorus (N + P) was increased from 1060 thousand tonnes to 2983 thousand tonnes during the period of ten years i.e. from 1970-71 to 1979-80. During this period the annual average production of both N + P was 1934.7 thousand tonnes and growth in absolute terms have been noted as 1060, 1239, 1384, 1374, 1518, 1828, 2340, 2670, 951 and 2983 thousand tonnes respectively. Only the year 1973-74 shows a declining

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5. For details see : Annual Review of Fertilizer Consumption and Production 1973-74 and 1992-93, FAI, New Delhi.

trend i.e. 951 thousand tonnes than previous years due to the high prices of inputs in international market. Again our domestic production of both nitrogen and phosphorus increased from 3005 to 8542 thousand tonnes during the period from 1980-81 to 1989-90. By the end of second decade, only the year 1989-90 shows a declining trend due to rise in price of DAP and Phosacid in international market. During this second decade, the annual average growth has been calculated as 5876.6 thousand tonnes for both N + P fertilizers and growth in absolute terms have been known as 3005, 4093, 4414, 4555, 5235, 5753, 7074, 7131, 8964 and 8542 thousand tonnes respectively. In the recent years like 1990-91, 1991-92 and 1992-93 production of both N + P fertilizers have been drawn as 9044, 9863, and 9752 thousand tonnes. In 1992-93 production was declined only 111 thousand tonnes. Hence, in 23 years i.e. from 1970-71 to 1992-93, the annual average production rate of both nitrogen and phosphorus has been calculated as 4772.91 thousand tonnes. During the entire period of study it has been observed that the production of both nitrogen and phosphorus in negative trends i.e. in the year 1973-74, 1989-90 and 1992-93, it has been drawn as - 0.72, - 4.70 and - 1.112 percent respectively. The reasons for low production of both nitrogen and phosphorus are as following.[6]

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6. For details see: Annual Review of Fertilizer Consumption and Production 1973-74 and 1992-93, FAI, New Delhi.

(i) Shortage of raw-materials and equipment breakdown;

(ii) lack of power and water resources;

(iii) labour skill-less-ness in factories;

(iv) non payment of outstanding due caused restlessness among the workers.

Nutrient-wise Imports of Fertilizer :

In order to inspire the farmers to increase the use of fertilizers the domestic production was not made at the desired level and thus the Government made it possible through imports. Though the imports of fertilizers have been a regular trend since 1951-52 or from year to year. The imports of nitrogen fertilizer was 29 thousand tonnes, phosphorus 15 thousand tonnes and potassic 8 thousand tonnes in 1951-52. The total NPK fertilizers increased from 52 thousand to 881 thousand tonnes during the year from 1951-52 to 1969-70. From 1970-71 onwards, it has been a continuous phenomenon to import of chemical fertilizers from international market. This was due to the introduction of green revolution or HYV in 1966. Our country is not able to produce potassic fertilizer to meet the domestic demand. So, the country is bound to import total potassic fertilizer. Table 4.3 gives a detail explanation

about the imports of nitrogenous, phosphorus and potassic fertilizers from 1970-71 to 1992-93. It has been observed from the table that our imports of all nutrient fertilizers are increasing from 1970 onwards except some years.

Table 4.4 shows a clear picture of imports of total chemical fertilizers (NPK) since 1970. It has been drawn from the table that the total NPK fertilizers were imported 629 thousand tonnes in 1970-71 which increased to 2005 thousand tonnes in the year 1979-80 and during this period the annual average rate was calculated 1390.2 thousand tonnes. The total growth have been found as 629, 997, 1195, 1242, 1643, 1635, 1050, 1513, 1993, and 2005 thousand tonnes respectively i.e. from 1970-71 to 1979-80. During the second decade, it has been picked up from 2759 to 3112 thousand tonnes i.e. from 1980-81 to 1989-90 and annual average growth was reached a level of 2221.4 thousand tonnes. The total growth in absolute terms have been found as 2759, 2042, 1132, 1355, 3625, 3315, 2275, 984, 1615 and 3112 thousand tonnes respectively. In 23 years i.e. from 1970-71 to 1992-93 it was increased (annual average) 1915.34 thousand tonnes. In recent years import of NPK fertilizers vary from 2754, 2770 and 2413 thousand tonnes i.e. the year 1990-91, 1991-92 and 1992-93 respectively. During

entire period of study it has been observed a declining trends of imports in few years such as - 0.48, - 35.77, - 25.98, - 44.56, - 8.55, - 31.37, - 56.74, - 11.5, and - 12.88 thousand tonnes in percentage change in the years 1975-76, 1976-77, 1981-82, 1982-83, 1985-86, 1986-87, 1987-88, 1989-90, 1990-91 and 1991-92 respectively, because of the Government to consumption estimates as well as to stocks in hand of that years reduced the imports of chemical fertilizers (NPK). But there are major factors to import fertilizers from developed countries like USA, UK, former USSR and Germany etc. which are as following.[7]

i) Plant breakdown or sutting down of plant for want of water or power;

ii) Government policy decision to encourage captive power plant in fertilizer units;

iii) The problem really lies in the estimates of consumption;

iv) Inventory holding is a very costly affair, every tonne of additional stock of year costs in India on average Rs. 35 per month till 1985;

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7. For details see : Annual Review of Fertilizer Consumption and Production 1978-79, FAI, New Delhi.

v) The uninterrupted flow of material from the factory port to the field gets a jolt putting the smooth system out of gear;

vi) The manufacturers run into serious working capital problems and also incur heavy inventory cost;

vii) The exchequer in the final analysis bears a heavier subsidy burden;

Viii) Problem of heavy imports of total potassic fertilizer on high prices;

ix) Value of imports was higher in 1992-93 because of devaluation of rupee 22 percent since early july 1992 and partial convertibility of Rupee since March 1992; and

x) Quantum of urea import was twice that of 1991-92 level, import price at a high level throughout the year 1992-93 in the international market.

The study of the trends in production of fertilizers their consumption and the import reveals that Government of India paid its attention to provide more and more fertilizers to the farmers so that their use might be widespread in obtaining the highest possible agricultural production in the country.

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TABLE - 4.1

Trends of Nutrient-wise Fertilizer Consumption in India since 1970

(000, Tonnes)

Year	Nitrogen (N)	Phosphorus (P_2O_5)	Potassic (K_2O)	Total (NPK)	Annually Increase or Decrease(NPK)	Annually Percentage (%) change (NPK)
1970-71	1479	541	236	2256	-	-
1971-72	1798	588	301	2687	431	19.10
1972-73	1839	581	348	2768	81	3.01
1973-74	1829	650	360	2839	71	2.56
1974-75	1766	471	336	2573	- 266	- 9.36
1975-76	2149	467	278	2894	321	12.47
1976-77	2459	635	319	3411	517	17.86
1977-78	2913	866	506	4285	874	25.62
1978-79	3419	1107	591	5117	832	19.41
1979-80	3498	1151	606	5255	138	2.69
1980-81	3678	1214	624	5516	261	4.96
1981-82	4069	1322	676	6067	551	9.98
1982-83	4224	1436	726	6386	319	5.25
1983-84	5204	1730	775	7709	1323	20.71
1984-85	5486	1886	838	8210	501	6.49
1985-86	5661	2005	808	8474	264	3.21
1986-87	5716	2079	850	8645	171	2.01
1987-88	5717	2187	880	8784	139	1.60
1988-89	7251	2721	1068	11040	2256	15.68
1989-90	7386	3014	1168	11568	528	4.78
1990-91	7997	3221	1328	12546	978	8.45
1991-92	8046	3321	1361	12728	182	1.45
1992-93(P)	8435	2871	943	12249	-479	- 3.76

Table 4.1 contd.

Annual Average

Year	Notrogen (N)	Phosphorus (P_2O_5)	Potassic (K_2O)	Total (NPK)
1970-71 to 1979-80	2314.7	705.7	388.1	3408.5
1980-81 to 1989-90	5439.2	1959.4	841.3	8239.9
1970-71 to 1992-93	4435.52	1740.69	692.43	6652.47

NOTE: P = Provisional

SOURCE: Fertilizer Statistics - 1992-93, FAI, New Delhi.

TABLE - 4.2

Trends of Nutrient-wise Domestic Production of Fertilizers Since 1970

(000, Tonnes)

Year	Nitrogen (N)	Phosphorus (P_2O_5)	Total (N+P)	Annually Increase or decrease(NP)	Annually Percentage (%) change (NP)
1970-71	832	228	1060	-	-
1971-72	949	290	1239	179	16.88
1972-73	1054	330	1384	145	11.70
1973-74	1050	324	1374	-10	- 0.72
1974-75	1187	331	1518	144	10.48
1975-76	1508	320	1828	310	20.42
1976-77	1862	478	2340	512	28.00
1977-78	2000	670	2670	330	14.10
1978-79	2173	778	2951	281	10.52
1979-80	2220	763	2983	32	1.08
1980-81	2164	841	3005	22	0.73
1981-82	3143	950	4093	1088	36.20
1982-83	3430	984	4414	321	7.84
1983-84	3491	1064	4555	141	3.19
1984-85	3917	1318	5235	680	14.92
1985-86	4323	1430	5753	518	9.89
1986-87	5412	1662	7074	1321	22.96
1987-88	5466	1665	7131	57	0.80
1988-89	6712	2252	8964	1833	25.70
1989-90	6747	1795	8542	- 422	- 4.70
1990-91	6993	2051	9044	502	5.87
1991-92	7301	2562	9863	819	9.05
1992-93 (P)	7431	2321	9752	- 111	- 1.12
	Annual Average				
1970-71 to 1979-80	1483.50	451.20	1934.7		
1980-81 to 1989-90	4480.50	1396.10	5876.6		
1970-71 to 1992-93	3537.60	1104.65	4772.91		

NOTE: P = Provisional

SOURCE: Fertilizer Statistics, 1992-93, FAI, New Delhi.

TABLE - 4.3

Trends of Nutrient-wise Import of Fertilizer in India since 1970

('000 Tonnes)

Year	Nitrogen (N)	Phosphorus (P_2O_5)	Potassic (K_2O)	Total (NPK)	Annual Increase or Decrease(NPK)	Annual Percentage % change (NPK)
1970-71	477	32	120	629	-	-
1971-72	481	248	268	997	368	58.50
1972-73	665	205	325	1195	198	19.85
1973-74	659	213	370	1242	47	3.93
1974-75	884	286	473	1643	401	32.28
1975-76	996	361	278	1635	- 8	-0.48
1976-77	750	23	277	1050	- 585	- 35.77
1977-78	758	164	591	1513	463	44.09
1978-79	1233	243	517	1993	480	31.72
1979-80	1295	237	473	2005	12	0.60
1980-81	1510	452	797	2759	754	37.60
1981-82	1055	343	644	2042	- 717	- 25.98
1982-83	425	63	644	1132	- 910	- 44.56
1983-84	656	143	556	1355	223	19.69
1984-85	2009	745	871	3625	2270	167.52
1985-86	1616	805	894	3315	- 310	- 8.55
1986-87	1106	279	890	2275	-1040	- 31.37
1987-88	175	-	809	984	-1291	- 56.74
1988-89	219	407	989	1615	631	64.12
1989-90	523	1311	1278	3112	1497	92.69
1990-91	412	1016	1326	2754	- 358	- 11.50
1991-92	566	968	1236	2770	16	0.58
1992-93(P)	1060	727	1081	2868	98	3.54
Annual Average:						
1970-71 to 1979-80	819.8	201.2	369.2	1390.2		
1980-81 to 1989-90	929.4	454.8	837.2	2221.4		
1970-71 to 1992-93	849.13	403.09	682.91	1935.13		

NOTE: P = Provisional

SOURCE: Fertilizer Statistics, 1992-93, FAI, New Delhi

TABLE - 4.4

Trends of Total Consumption, Production and Import of Fertilizers in India Since 1970.

(000, Tonnes)

Year	Consumption (NPK)	Production (NPK)	Gap between consumption & Production	Import (NPK)	Consumption in % change	Production in % change	Import in in % change
1970-71	2256	1060	1196	629	-	-	-
1971-72	2687	1239	1448	997	19.10	16.88	58.50
1972-73	2768	1384	1384	1195	3.01	11.70	19.85
1973-74	2839	1374	1465	1242	2.56	- 0.72	3.93
1974-75	2573	1518	1055	1643	9.36	10.48	32.28
1975-76	2894	1828	1066	1635	12.47	20.42	- 0.48
1976-77	3411	2340	1071	1050	17.86	28.00	- 35.77
1977-78	4285	2670	1615	1513	25.62	14.10	44.09
1978-79	5117	2951	2166	1993	19.41	10.52	31.72
1979-80	5255	2983	2272	2005	2.69	1.08	0.60
1980-81	5516	3005	2511	2759	4.96	0.73	37.60
1981-82	6067	4093	1974	2042	9.98	36.20	- 25.98
1982-83	6386	4414	1972	1132	5.25	7.84	- 44.56
1983-84	7709	4555	3154	1355	20.71	3.19	19.69
1984-85	8210	5235	2975	3625	6.49	14.92	167.52
1985-86	8474	5753	2721	3315	3.21	9.89	- 8.55
1986-87	8645	7074	1571	2275	2.01	22.96	- 31.37
1987-88	8784	7131	1653	984	1.60	0.80	- 56.74
1988-89	11040	8964	2076	1615	15.68	25.70	64.12
1989-90	11568	8542	3026	3112	4.78	- 4.70	92.69
1990-91	12546	9044	3502	2754	8.45	5.87	- 11.50
1991-92	12728	9863	2865	2770	1.45	9.05	0.58
1992-93(P)	12249	9752	2497	2868	3.76	- 1.12	3.54
	Annual Average						
1970-71 to 1979-80	3408.5	1934.7		1390.2			
1980-81 to 1989-90	8239.9	5876.6		2221.4			
1970-71 to 1992-93	6652.47	4772.91		1935.13			

NOTE: P = Provisional

SOURCE: Fertilizer Statistics, 1992-93, FAI, New Delhi.

C H A P T E R - V

Fertilizer Policy in India.

C_H_A_P_T_E_R_ - V

The present chapter deals with the various policy measures regarding fertilizer both for farmers or customers who are the users of the product and producers are producing fertilizer. Such policies like fertilizer pricing policy, subsidy policy on fertilizers, distribution policy and financial policy regarding the fertilizer. All such policies regarding fertilizers are equally important for increasing agricultural production in general and foodgrains in particular. Hence there are three dimensions of fertilizer policies as first is regarding for the production, second is regarding pricing and distribution and the third is regarding the consumption/utilization. In this chapter Table 5.1 deals with the current maximum sales point of fertilizer material (price of fertilizer materials), Table 5.2 highlights the payment of central subsidy on both imported and domestic fertilizers in Rupees millions, Table 5.3 shows the capacity utilization norms based on feedstock and age of plants under the formula of Retention Price Scheme (RSP), Table 5.4 reveals the number of sales point (dealers) for cooperative and Institutional and private and lastly, Table 5.5 indicates the warehousing facilities available with different agencies.

Pricing Policy of Chemical Fertilizers :

Fertilizer pricing policy is a complicated issue involving affordability of the farmers, general stability of the industry, foodgrains production and foreign exchange outflow etc. The per hectare consumption of fertilizer nutrients in the country has grown from 34.27 Kg. in 1981-82 to 72.4 Kgs. in 1991-92. This is much below the world standard including standards in some of the developed countries of Asia.[1] The consumption ratio of nitrogen (N) in relation to phosphorus (P_2O_5) was 2.5 and in relation to potassic (K_2O) it was 6.8 per hectare consumption in 1989-90, in Korea was 408 Kgs, in Egypt 404 Kgs and of the European countries it was well above 200 Kg.[2] Hence, pricing policy of fertilizer plays an important role in ensuring its availability to the farmers in the desired quantities.

The pricing policy in relation to fertilizers is mainly focussed on the following objectives:

(i) To provide fertilizers to the farmers at reasonable and affordable prices and consequently, ensure an attractive input-output price ratio;

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1. Economic Intelligence Service: 'Fertilizer Pricing', Extracts from Report of the Joint Committee on Fertilizer Pricing, Bombay, Nov.1992, p.5

2. Ibid., p.6

(ii) To keep foodgrains prices low and within reach of weaker sections of the society;

(iii) To build self-sufficiency in foodgrains production consistent with food security;

(iv) To ensure growth of an efficient and healthy indigenous fertilizer industry by allowing fair return on investment;

(v) To increase and help maintain employment levels in the farm sectors; and

(vi) A uniform and low consumer price for fertilizers throughout the country.

The government has been attempting to maintain balance among diverse and contesting issues from the earlier days for fertilizer consumption by controlling its price. The consumer prices of fertilizers are fixed by the Government (Department of Agriculture & Cooperation) under the provisions of the Essential Commodities Act, 1955, in order to make fertilizers available to the farmers at uniform prices throughout the country.[3] A major shift in pricing arrangements took place due to the Middle East oil crisis of 1970 and 1973-74. The cost

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3. Op.cit., p.1

of imported urea, rock phosphate and sulphur increased.

On the basis of Marathe Committee recommendation in 1977, Retention Price Scheme (RPS) was introduced. An agency in the name of Fertilizer Industry Co-ordination Committee (FICC) was created to administer the retention price scheme.[4] However, the dilemma of pricing has been resolved by the Government at two levels, such as:

(i) The consumer prices are fixed based on the affordable capacity of the farmers under tne provisions of FCO and the retention prices are fixed for the individual plants based on the prescribed norms of efficiency,

(ii) The other elements having relevance with pricing is the subsidy payment by the Government on imported as well as indigenous production.

The Director of National Council of Applied Economic Research (NCAER) informed the Committee that only 48 percent of the fertilizer subsidy can be ascribed as going to the farmers. The rest of the subsidy according to him was shared

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4. Reconstruction of Diverse Interest, Business Analyst, Journal of Shriram College of Commerce, New Delhi, July-Dec.1991, pp.20-33.

by the Fertilizers Industry, feed-stock supplying agencies and consumers of foodgrains. The basis for arriving at the figure of 48 percent of the subsidy as going to farmers, was a comparison of domestic the witness said that it was on the basis of fertilizers over a period of nine years. If one considered the outprice of foodgrains the farmer is not being net-subsidised. The farmer is being net taxed in respect of output front; despite the subsidy on input price, his output prices are suppressed. He is paying hidden tax.

Upto 1966, under the provision of FCO the retail price of different types of fertilizers were fixed varying from area to area depending upon local conditions. From mid-sixties all straight nitrogenous fertilizers were subject to price control but the phosphatic fertilizers were brought under price control in 1979 and SSP in 1982. The statutorily fixed price retained almost unchanged during 1969 and 1974. The oil crisis led to hike in input costs and Government increased the price of fertilizers. But it is an unique commodity in India whose price reduced over the years. The urea price which was fixed at Rs.2000/- tonne in 1974 was reduced to Rs.1750/ tonne in 1976. In 1977 it was Rs.1550/ tonne and further came down to as lower as Rs. 1450/tonne by 1979. Similar phenomenon is also

evident during 1982 and 1986 when the price of the same material was reduced from Rs. 2350 to Rs. 2150 per tonne.[5] After 1986 upto 25th of July, 1991, the consumer price of fertilizers remained unchanged (except 7.5 percent discount during drought period of 1986-89) though the cost of feedstock and other inputs for production and imported fertilizers increased.

The price of fertilizers were stable and unchanged during the decade of eighties with a net effect of overburdened subsidy on indigenous production and imported fertilizers. To reduce subsidy, in the union budget of 1991-92, the customer's price to the farmers was increased by 40 percent which was resented from many corners and the Government was forced to reduce the increase upto 30 percent with an added element of exempting the small and marginal farmers from this price hike. Alongwith this increase, the low analysis fertilizers like AS, CAN, ACL and SOP were decontrolled. The Table 5.1 gives the maximum sales price of fertilizer which were applicable w.e.f. 31st January, 1986 and the changes made on 25th July and 14th August, 1991. The implementation of dual pricing has been questioned as many methods are expected to be adopted to jeopardise the

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5. Fertiliser Statistics 1990-91 : FAI, New Delhi, Table II-1.02.

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5. Fertiliser Statistics 1990-91 : FAI, New Delhi, Table II-1.02.

spirit behind this pricing. Later on Joint Parliamentary Committee (JPC) was constituted which submitted its report in August 1992 and based on its recommendations, the Government brought these changes. In the Table 5.1 (i) the price of urea was reduced by 10 percent from Rs. 3060 to Rs. 2754 per tonne; and (ii) retention price was reintroduced for the low analysis fertilizers which were decontrolled in August 1991.[6]

Fertilizer Subsidy :

Fertilizer subsidy is not unique for Indian farmers and producers. It is a pivotal part of the pricing system in almost all developing countries like as in Bangladesh, Brazil, Egypt, Korea, Pakistan and Sri Lanka. The formula of fertilizer subsidy varies from country to country, depending on the local conditions, but there are certain common objectives. The significant common feature is that fertilizer subsidy is an instrument of State Policy to provide foodgrains at reasonable prices to the weaker sections of the society and that fertilizer prices are pegged down to levels below the cost of production to encourage use of fertilizers and bring the product within

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6. New Fertilizer Pricing Policy : Directorate of Advertising and Visual Publicity, Ministry of Information and Broad Casting, Government of India, New Delhi, Oct. 1992, pp.1-12.

reach of the small and marginal farmers.[7] In other words, it is a means of reimbursing to the manufacturer the cost of production as per the pattern prescribed in the retention price scheme.[8] Fertilizer subsidy is the most important for the farmers. If they are not provided with fertilizers at affordable prices then within their capacity to transfer on the cost of the fertilizers to the consumers. Generally a large number of these consumers, they are below the poverty line, would not be able to afford the price. In other way, if the price of fertilizers shows the higher cost of production, specially the marginal farmers would not be able to purchase at this price. Thus it would restrict the production of foodgrains not using the fertilizers in adequate. The fertilizers price needs to be forced, so, that such class of small and marginal farmers would be encouraged to be the greater amount of these fertilizers. The farmers and fertilizer producers stand to gain by the system. Subsidy on fertilizer was given for the first time in India in 1973-74 on imported fertilizers on account of their steeply rising costs in the wake of world oil crisis and fertilizer subsidy on indegenously produced is worked out under the RPS introduced in 1977 on the recommendation of the Marathe Committee.[9]

7. BAWA. H.S. : Fertilizer Subsidy : Who Really Benefits ?, FAI Seminar Dec. 4-6, 1989, Fertilizer, Agriculture and National Economy, FAI, New Delhi, pp. SV/1-6.

8. Ibid., pp.SV/1-6

9. Gulati, A., Kalra, G.D. : Fertilizer Subsidy:Issues Related to Equity and Efficiency, Economic and Political Weekly, March 28th 1992, Bombay, p. A-43.

Fertilizer subsidy is the difference between the net realization from the customer and the retention price fixed for the individual unit. Subsidies equals the farmgate cost including remuneration for handling and distribution minus the selling price of fertilizers.[10] At present three types of subsidies are paid firstly on imported fertilizers, secondly on indigenous fertilizer and thirdly meant for inland freight commonly known as equated freight subsidy scheme. Some entrepreneurs perceive that profitability, unlike other industries is guaranted by the Government in fertilizer industry. That is the real catch in fertilizer subsidy.[11] Table 5.2 shows the central subsidy payment both on domestic and imported fertilizers in India.

Retention Price Scheme (RPS) :

Retention price scheme or fixed unit-wise in order to protect the interest of the manufacturers by assuring them a reasonable return (12 percent post-tax on net worth). The difference between the retention price, and the net realization by a manufacturing unit with reference to retail price by the Government, is paid as subsidy under the Retention Price-cum-Subsidy Scheme.

10. Narayan, Pratap : Who Benefits from Fertilizer Subsidies, Fertilizer Marketing News, FAI, New Delhi, Dec. 1991,pp.1-9.

11. Pranjpe, A.M. : The Subsidy Dilema , Economic Times, New Delhi, 6th August, 1992, p.12.

The RPS was initially fixed on the basis of recommendation of the Fertilizer Pricing Committee (Marathe Committee). In subsequent pricing periods, the RP have been fixed after getting the data from the fertilizer units. If there is any esclation/de-escalation in price of any input during the currency of the pricing period, the RP are revised with the approval of the Fertilizer Industry Coordination Committee (FICC). The norms of consumption and capacity utilization are effective for the duration of the pricing period i.e. three years.

Retention Price for nitrogenous and phosphatic fertilizers is fixed product-wise and plant-wise. It takes into account the cost of variable inputs, conversion cost, selling expenses and capital related charges. Variable cost includes the cost of feedstock, utilities, such as, water, electricity and steam and packing material. Conversion cost consists of salary and wages, contract labour, chemicals and consumables, repairs and maintenance, catalysts and overheads. Capital related charges consists of return on networth (networth = equity + free reserves), interest on borrowed funds and depreciation on fixed assets.

In addition to retention price subsidy, freight subsidy is paid to indigenous fertilizers units to cover the cost of movement of fertilizers from production points to consumption points (except in case of SSP) under the equated freight Scheme.

As regards SSP, since it is possible to fix industry-wise consumption norms for the basic raw-materials viz. rock phosphate and sulphur, there are uniform for the entire industry (with the sole exception of PPCL which uses Pyrites instead of sulphur to obtain sulphonic acid). In respect of SSP units the cost of production is divided into variable cost and fixed charges. Fixed charges are reviewed once in two years on the basis of the units data certified by a chartered Accountant. The variable cost is reviewed on a quarterly basis, for which the units are send certified data.

The farmer's price of fertilizer is generally lower than the cost of production. Obviously, the Government has to compensate the industry in the form of subsidy. So, on the basis of Marathe Committee recommendations the Government fixes the product-wise and plant-wise retention price since October, 1977 for nitrogenous and from February1979 for phosphatic

fertilizers. Retention price is in recognition that the selling price of fertilizers cannot be related to the cost of production nor it can be left to be determined by the supply and demand forces.[12]

The retention price for different plants were based on 12 percent post-tax return on networth at 80 percent capacity utilization and consumption norms of raw-material, inputs utilise and otner maintenance etc. The RPS is a doubledged weapon as it gives incentive to the units to improve their profitability by seeking to work better than the norms whereas the units which are inefficient and consequently unable to come upto the prescribed norms are not only denied the allowed return but may also incur losses depending on the shortfall in the actual operating performance and the norms.[13] The retention price norm was revised in April 1988 taking into account the capacity utilization and depreciation. The norms set were as follows :

i) The life of fertilizer plants which have gone on stream in 1982 and thereafter would be 15 years

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12. Narayan, Pratap : Fertilizer Marketing, Distribution and Subsidies in India, Fertilizer Marketing News, FAI, New Delhi, Feb. 1992, pp.1-7.

13. Gupta, U. : Op.cit., pp.11-18.

for the purpose of calculation of retention price;

ii) The capacity utilization norms were changed from flat 80 percent to varying degrees based on the operation period of the plants and feedstock used. The norms are depicted in Table 4.3. The capacity utilization of ammonia and urea would be worked out on the basis of 330 stream days with the exception of Gorakhpur unit whose working days would be 300 to be increased upto 330 days after rehabilitation.[14]

iii) The depreciation charge to be 4.75 percent based on 20 years estimate of plants' life. Later the Government appreciated the depreciation rate upto 6.5 percent spread over 15 years in place of 20 years.[15]

The ex-factory retention prices are fixed and administered by FICC on three years cyclical basis. An evaluation clarifies that pricing mechanism in the last half decade has ensured growth in investment, installed capacity, capacity

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14. Public Enterprise Survey 1989-90 : Department of Public Enterprise, Ministry of Programme Implementation, Govt. of India, New Delhi, Vol.I, pp.108-109.

15. Devarajan, P. : Fertilizer Subsidy Payment at Rs.2000 crores, Financial Express, New Delhi, 12 Feb., 1990.

utilization, production and consumption of fertilizers and profitability of the units.[16]

Distribution Policy of Fertilizer :

Chemical fertilizer is a bulk commodity. It is produced throughout the year in industries at different places in the country where the consumption takes place on seasonal basis on a much wider in rural areas covering 5.57 lakh villages. To secure that fertilizers are available to the farmers in desire quantity at the right time. Channels are designed and physical distribution is managed. These are as follows :

1) Distribution channel of Fertilizers :

The industry is using the established channel for fertilizer distribution and the imported non-potassic fertilizers are handled by pool handling agencies which are distributing them through institutional agencies, mainly co-operative societies and private dealers. As per the policy of the Government that 50 percent of the allocations to the companies are to be distributed through institutional agencies and the balance through trade.[17] The imported potassic fertilizers

16. Mittal, D.K. : Op.cit., pp.20-33.

17. Singh, Harbhajan : Fertilizer Distribution System - A Critical Analysis, Fertilizer News, FAI, New Delhi, Aug., 1990, pp.39-45.

are handled by IPL which also uses the Co-operative societies and the private distributors. Multi-tire, multi-channels are adopted by the companies in making product available to the farmers. Similarly, the fertilizer dealers also adopt multi-brand approach to dealership. A dealership survey in 1981-82 indicated that 72 percent of the dealers were handling fertilizers of 6 to 10 companies where 23 percent were operating the business of 11-15 companies.[18]

Dealers are in constant touch with the farmers and it is they who actually sell the product so the companies take due care and attention in selection training, and motivation of the retail dealers. While selecting dealers, financial soundness, experience, knowledge of the product and FCO, ability to communicate, local standing location of the sales point etc. are assessed.[19] They are assigned the responsibility of selling, sales promotion, stockholding and secondary transportation.[20] The companies take special care in their training, on sales skill, communication skill and technical skill. A part from that the company sales-persons usually

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18. Gupta, U.C. : Impact of Credit on Fertilizers Consumption, FAI, New Delhi, 1986, p.158.

19. Siridharan,J. & Kharbanda, S.C.: Role of Dealers in Fertilizer Marketing, Fertilizer News, FAI, New Delhi,Aug.1987, pp.59-61.

20. Menon, K.N.N.: Dealer Development and Motivation, Fertilizer News, FAI, New Delhi, Aug. 1988, pp.33-35.

visit the outlets to solve their business problems and motivate them for greater selling effort. The number of dealers are given in Table 5.4 which shows that in 1990 more than 2.3 lakh dealers were operating in the market which has increased by 98 percent during the last ten years.

The increase in dealers in recent period has been due to elimination of licensing of fertilizer outlets by simple registration, 66 percent of the total retail outlets are with the private dealers which were 56 percent in 1980. During the period Co-operative Societies role has weakened in fertilizer distribution. The dealers margin were also fixed by the Government from time to time. Presently it is Rs. 150 per tonne for the apex body and Rs. 130 for Co-operative Societies and private traders.[21] From time to time the margins have been studied by Committees like Sivaraman Committee, Quraishi Committee and PDIL/FICC.[22]

(2) The physical distribution of fertilizer comprises four important aspects, packaging, handling, transportation and ware-housing.

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21. Joshi, L. : Fertilizer Marketing and Promotion, Article presented in Executive Development Programme, FCI Institute of Management Development, New Delhi, 1989,p.3.

22. Thomas, T.T. : Recasting the Present Distribution System, Fertilizer News, FAI, New Delhi, pp.29-32.

(i) Packaging :

To handle 270 lakh tonnes of fertilizer materials and 540 million bags of 50 Kg each is required as fertilizer packing is mostly done in 50 Kg net weight but some companies have tried to supply smaller bags of 40 and 25 Kg in dryland and hilly areas where the fertilizer consumption is very low. To cater the requirements of small farmers the small bags of 10, 20, 30 Kgs can also be used. But this will increase the packing and handling cost. Jute bags have been common in the past but being a natural fibre it it sensitive to fungus and micro-organism, atmospheric degradation resulting in yellowing of the fabric and ultimate strength of the material particularly when exposed to moisture and light.

Due to these disadvantages HDPE bags were introduced in 1974 which was resisted by the workers as the bags were slippery. From 1980, the industry started to use HDPE bags at a larger scale and for its better protection of content against hugroscopicity , higher value and varied after use services, acceptability among customers increased.[23] But its use has been restricted under the jute packaging order in 1988 by the

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23. Narayan, P.V. : Packaging of Fertilizers, Fertilizer News, FAI, New Delhi, Aug.1986, pp.37-41.

Ministry of Textiles, Government of India to protect the decaying jute industry and the manufacturers are directed to use jute bags for packing urea.[24] As per the FCO manufacturers have to comply with the requirements of packing, marketing, bag size etc. The name of the product, percentage of nutrient content, date of manufacture, name and address of manufacturer are to be printed on the bags.

(ii) Handling :

The mode of transport adopted differentiate the handling requirements of fertilizers. It has been estimated that under normal conditions a bag has to face the hardship of atleast 15 handling in transporting fertilizers by rail from industry to the farmers.[25] The bags are made sturdy to bear the shocks. Mechanised and semi-mechanised handling,[26] loose movement, flexible nylon bags, big containers, bulk handling and pelletisation are some alternative measures suggested for handling fertilizers.[27]

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24. Panday, S.N. and Vaswani, L.K. : Fertilizer Marketing Constraints in the Nineties, Fertilizer News, FAI, New Delhi, Aug. 1990, pp.15-22.

25. Chandra, Sarvesh : Packaging and Handling in Boosting Fertilizer Consumption, Fertilizer News, FAI, New Delhi, Aug.1987, pp.43-46.

26. Laxminarayanan, S. : Transportation Constraints in Fertilizer Distribution, Fertilizer News, FAI, New Delhi, Sept. 1991, pp.19-25.

27. Chauhan, K.K.S.: Challenges of Logistic in Seventh Plan, Need for Integrated Transportation system, Fertilizer News, FAI, New Delhi, Aug.1986, pp.11-17.

(iii) Transportation :

Transportation is an integral part of any product output and distribution system to provide means of serving the consumers in the market. It is one of the critical areas which is directly related to the fertilizer use. The main three most common modes of transportation available in the country, are, road, rail and water. The ECA allocation have their impact on transportation as considerations are made to reduce criss-cross movement of similar fertilizers, movement through difficult rail sections and breakage of guage should be avoided and lead time should be reduced.[28] More than 99 percent of the fertilizers are transported by railways and roadways and a very nominal amount by water. Fertilizer can be off-loaded at more than 7000 railway stations but after a decision of full rake load on centre to centre basis, the number of stations declared suitable has come down upto 400. Out of 372 broad guage rake points, 35 locations of high fertilizer consumption area of six northern states have been identified as "nodal points" to equip them with the covered railway sidings, mechanised, handling, buffer stocking, circulation track loading etc.[29]

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28. Mahapatra, N.K.S. : Need for Rationalization Fertilizer Distribution Plan, Fertilizer News, FAI, New Delhi, Aug. 1987, pp.17-20.

29. Narain, Shanti : Integrated Transport Infrastructure For Fertilizer Industry, Fertilizer News, FAI, New Delhi, Sept. 1991, pp.15-18.

But there is acute shortage of covered wagon and 30,000 wagons per year for 5 years are required to transport fertilizers. A train load carries 2200 tonnes of fertilizer material.[30] Furthermore, the average lead has reduced from 1100 Km in 1980-81 to 972 Km in 1990-91 for fertilizers other than urea. The urea lead has reduced upto 246 Km in 1989-90 from 800 Km in 1980-81.[31]

The roadways are gaining more share due to secondary movement from rail points to block headquarters. Over and above that they are cheaper for shorter distance, take minimum transit time, minimum handling loss and minimized problems of claims though they carry low volume of fertilizers.[32] The Government subsidies the industries under equated freight subsidy scheme for the transportation cost from industry upto block headquarters in respect of urea, DAP and complex fertilizers and upto rail heads/field godowns for others.[33]

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30. Subramanian, T.A. : Fertilizer Transportation - An Overview, Fertilizer News, FAI, New Delhi, Sept.1991, pp.11-14.

31. Chakarbarty, Sovan : Logistic for Fertilizer Distribution Fertilizer Marketing News, FAI, New Delhi, Feb.1992, pp.19-21.

32. Department of Fertilizers : Ministry of Chemicals and Fertilizers, Government of India, New Delhi, Annual Report, 1990-91, p.32.

33. Gupta, R.C. : System Approach to Rationalisation of Transportation, Fertilizer News, FAI, New Delhi, Sept. 1991, pp.35-41.

(iv) Warehousing :

Since production is a flow variable and it takes place throughout the year. In the other hand the consumption is reasonable made by farmers who by them just a few days earlier their application to the consumption. It has definitely enhanced the necessity to build ware-house for the fertilizers. In addition to that some of the chemical fertilizers are hygroscopic. Some acidic and few explosive in nature and their texture and composition are to be maintained requiring additional protection under ideal storage conditions. The storage capacity at the plant silos being only to the extent of 4-6 weeks of production, it is essential to move throughout the year and store them at some other places.[34]

The public sector organization - Central Warehousing Corporation (CWC) and State Warehousing Corporation (SWC) in addition to the co-operative societies are providing warehousing and handling facilities of fertilizers. Private godowns are also available but at a limited scale. The warehousing capacity available is of 280 lakh tonnes, the details

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34. Gupta, R.C., Op.cit., pp.35-41.

of which is given in Table 5.5. They are located at different centres are hired by the fertilizer industries. It has been estimated that to store one tonne of fertilizers in a bag of 50 Kg requires a carpet area of 0.51 Sq. meter x 4.8 meter storage height. 30 percent of the space is consumed in providing free passage for handling purposes.[35]

Financial Policy of the Fertilizer and Inducement to the Farmers :

Financial policy play a greater role in needs to achieve maximum quantity of fertilizers consumption to the small and marginal farmers. They are having of 75 percent of the total holdings have limited investment ability to adoption of modern technology specially use of fertilizers. It has also importance to increase inventory holding with manufacturers. There are three most important way to facilitate to the manufacturers and peasant farmers. These are as following, like credit by the Banks, Crop Insurance and Lead Fertilizer supplier.

i) Cash Credit :

The problem of cash credit management did not pose any serious threat to production during 1983-84 due to significant

35. Tondon, H.L.S. & Narayan : Fertilizers in Indian Agriculture (Past, Present and Future (1950-2000), Fertilizer Development and Consultation Organization, New Delhi, 1990, p.66.

decline in the inventory holding with manufacturers. This does not, however, refuse the need for revision in the Tondon Committee norms for inventories and receivables. Along range review of fertilizers marketing scene would reveal that both inventory commitments as also the funds locked up on account of receivable have gone up substantially in recent years. As a result, norms which were fixed about a decade ago are no longer valid today. The R.B.I. has set up a special sub-committee to review the norms for the fertilizer industry.[36] Even as the level of inventories continued to mount in the overall situation to overload, the incipient, liquidity problems got compounded because of non-availability of insufficient cash credit accomodation from the banking system. In the first instance, the introdinate delay in notification of the revised norms for working capital finance for the fertilizer industry which were enforced w.e.f. 26th Nov. 1986, denied the industry the much needed relief for more than one year, the revised norms having been approved by the R.B.I. way back in August 1985. Secondly, even ad hoc cash credit accomodation necessiated by the unprecedented increase in the inventories was not forthcoming in requisite measures despite

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36. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1993-94, New Delhi,p.96.

appreciation by the R.B.I. of need for the same in the developing extraordinary situation. In fact, a high level meeting taken by the Deputy Governor, R.B.I. on 8th June 1987 has failed to produce anything concrete in terms of additional ad hoc cash credit to fertilizer units which are even struggling to sustain production for want of adequate cash generation.[37]

ii) Crop Insurance :

The crop insurance scheme was introduced in Kharif 1985 with a view to provide financial support to the farmers in the event of a crop failure due to unforeseen circumstances like flood and drought. It is also provided the credit eligibility to the farmers in the event of crop failure for the next crop season. The scheme cover wheat, pulses, rice, oilseeds, millets, fruit crops and cotton were covered under the scheme. However, ever since the introduction of the scheme the weather has been erratic. Consequently, the claims are stated to have far exceeded the premium collected. In Kharif 1987, which witnessed the worst drought, the claims were reported to have been nearly 30 times the premium collected.

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37. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1986-87, New Delhi, p.99.

The Government is reported to have temporarily suspended the scheme for Kharif 1988 pending review of the scheme.[38]

As against the initial coverage of 2.33 million farmers and 4.18 million hectares during Kharif 1985, the coverage increased to 3.77 million farmers and 7.4 million hectares during Kharif 1986 registering a growth rate of 62 percent in terms of number of farmers and 77 percent in terms of coverage of additional land. The sum insured for various crops during Kharif 1986 increased to Rs.828 crore from Rs. 540 crores during 1985. Likewise, premium income increased from Rs. 9.3 crore during 1985 to Rs. 14.5 crore in Kharif 1986 has increased in all respects and there is better acceptability of the scheme.[39] According to estimates available at present, the claim in respect of Kharif 1986 crops may amount of nearly Rs.120 crore because of the crops having been affected both by floods as in Andhra Pradesh and West Bengal and by drought in State like Gujarat, Maharashtra, Karnataka and Rajasthan with Andhra Pradesh being the top claimants followed by the states like U.P., Karnataka, M.P., Orissa and Kerala. After this Government again had recommended some changes in the scheme which

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38. Fertilizer Association of India : Annual Review of Fertilizer Consumption and Production, 1987-88, New Delhi, pp.100-104.

39. Annual Review of Fertilizer Consumption and Production,1987, Op.cit., p.101.

affected from 1987. It had been decided 3 indemnifiable limits viz. 80 percent, 85 percent and 90 percent depending on the norming average of the last three years yield.[40] Another recommendations accepted by the Government provides that the State Government will have the freedom to opt for the scheme with reference to the districts as a unit which would, however, not be allowed to change for a period of three years from Kharif 1987.[41] Based on the suggestions received from some of the states, it is likely to that sugarcane and potato crops may also be included under the scheme in due course.

iii) Lead Fertilizer Supplier (LFS) :

The lead fertilizer supplier was introduced in the Zonal Conferences for Rabi 1986-87 when the states were requested to finalize names of various LFS inconsultation with the fertilizer manufacturers for each district and state. According to this scheme the LFS are entrusted with the following functions :[42]

(a) Assessment of requirement for the district for each season;

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40. Annual Review of Fertilizer Consumption and Production, 1986-87, Op.cit., p.101

41. Ibid., p.101

42. Ibid., p.106.

(b) Compilation of statistics particularly of consumption and stocks;

(c) Training of dealers and farmers;

(d) Fertilizer promotion activities especially in rainfed and other difficult areas;

(e) Opening of additional outlets in rainfed areas.

But LFS scheme did not make much headway during 1986-87. Thus, more effective steps have now been taken to implement the scheme in the right earnest. The concept in itself is good and it is expected that ultimately this will help in bringing desired improvement in compiling data of fertilizer consumption and also in making more realistic demand assessment.[43] During 1987-88, the LFS at the state and the districts level were identified by the state Governments in consultation with the fertilizer manufacturers and associated them in implementing the objectives of the concepts. LFS have been requested to prepare detailed action plan and chalkout strategy for increased fertilizer consumption for each district for the next five years in collaboration with the State Government functionaries.[44]

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43. Annual Review of Fertilizer Consumption and Production, 1986-87, Op.cit., p.106.

44. Ibid., p.104.

The fertilizer policy is multi-dimensional and having mainly three objectives namely, raising production of indigenous fertilizers, improving the supply conditions and encouraging the farmers to use the larger amount for increasing the production and productivity of agricultural commodities specially of the foodgrains in the country.

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TABLE - 5.1

CURRENT MAXIMUM SALES POINT OF FERTILIZER MATERIALS

(Rs./Tonnes)

Material	Effective from		Current Price w.e.f. 14.8.1991
	31.1.86	25.7.91	
Urea	2350	3300	3060
DAP (14-46-0)	3600	5040	4680
SSP (16% Powder)	950	1340	1240
SSP (Granular)	1100	1540	1450
SSP (14% Powder)	820	1160	1080
JSP (46% P_2O_5) granular	2600	3640	3380
Powder	2400	3360	3120
Urea Amm.Phos.(24-24-0)	3050	4280	3960
(28-28-0)	3600	5040	4680
Amm.Phos P.Sulph.(16-20-0)	2300	3220	3000
(20-20-0)	2600	3640	3380
Nitro Phosph. (15-15-15)	2100	2940	2740
(20-20-0)	2400	3360	3120
(23-23-0)		4120	3800
NP/NPK Complex(17-17-17)	2600	3640	3380
(14-28-14)	3050	4280	3960
(19-19-19)	2950	4140	3840
(10-26-26)	2950	4140	3840
(12-32-16)	3250	4560	4220
MOP (60% K_2O)	1300	1820	1700

SOURCE: Annual Review of Fertilizer Production and Consumption 1990-91, Fertilizer News, Sept.1991, p.107.

TABLE - 5.2

CENTRAL SUBSIDY PAYMENT ON FERTILIZER

Year	Imported Fertilizer			Domestic Fertilizer			Total (Rs.m.)	Total Subsidy as percentage increase or decrease.
	Total (Rs.mill.)	Per Kg. (Rs.)	Per tonne (Rs.)	Total	Per tonne	Per Kg.		
1	2	3	4	5	6	7	8	9
1973-74	330	0.26	266	-	-	-	330	-
1974-75	3710	2.25	2258	-	-	-	3710	1024.24
1975-76	2420	1.48	1480	-	-	-	2420	- 34.77
1976-77	520	0.49	495	600	256	0.25	1120	- 53.71
1977-78	2410	1.59	1593	250	94	0.09	2660	137.50
1978-79	1710	0.85	858	1722	584	0.58	3432	29.02
1979-80	2830	1.41	1411	3208	1075	1.07	6038	75.93
1980-81	3350	1.21	1214	1700	566	0.56	5050	- 16.36
1981-82	1000	0.48	490	2750	672	0.67	3750	- 25.74
1982-83	550	0.48	486	5500	1246	1.24	6050	61.33
1983-84	1420	1.04	1048	9000	1976	1.97	10420	- 72.23
1984-85	7273	2.00	2006	12000	2292	2.29	19273	84.96
1985-86	3237	0.97	976	16000	2781	2.78	19237	- 0.18
1986-87	1971	0.86	866	17000	2403	2.40	18971	- 1.38
1987-88	1140	1.15	1159	20500	2875	2.87	21640	14.06
1988-89	2010	1.24	1245	30000	3347	3.34	32010	47.92
1989-90	7710	2.47	2478	37710	4415	4.41	45420	41.89
1990-91	6593	2.39	2394	37297	4124	4.12	43890	- 3.36
1991-92	13000	4.69	4693	35000	3549	3.54	48000	9.36
1992-93^{p}	15000	6.21	6216	35000	3589	3.58	50000	4.16
							(65770)	(37.02)

NOTE: p = Provisional or Budget Estimates, ( ) = Revised Estimates.

SOURCE: (i) Desai (1986) in Segura et al for 1973-74 to 1976-77.
(ii) Fertilizer Statistics - 1991-92 for 1977 to 1992-93.

TABLE - 5.3

CAPACITY UTILIZATION NORMS BASED ON FEEDSTOCK AND AGE OF PLANTS.

(In percentage)

Feed Stock	1st Year	2 to 10 Years	Over 10 yrs.
Gas Based	80	90	85
Coal Based	60	60	55
Other than coal and gas based	80	85	80
Phosphoric Acid Plant	75	75	70

SOURCE: Compiled from PE Survey, Volume 1, Department of Public Enterprise, Ministry of Programme Implementation, Government of India, New Delhi, 1989-90, pp.108-109.

TABLE - 5.4

NUMBER OF SALES POINT (DEALERS)

(No. in '000)

As on	Co-operative and Institutional	Private	Total	Co-op:Private Ratio
1	2	3	4	5
31-3-75	39.2	59.5	98.7	39.7 : 60.3
31-3-80	51.6	64.9	116.5	44.2 : 55.8
31-3-83	50.2	80.6	130.8	38.4 : 61.6
31-3-85	59.7	96.0	155.7	38.3 : 61.7
31-3-87	56.8	105.8	162.6	35.0 : 65.0
31-3-88	61.0	114.0	175.0	34.9 : 65.1
31-3-89	71.8	135.0	206.8	34.7 : 65.3
31-3-90	78.7	152.6	231.3	34.0 : 66.0

SOURCE: Fertilizer Statistics 1990-91, FAI, New Delhi, Table No.5.10.

TABLE - 5.5

WAREHOUSING FACILITIES AVAILABLE WITH DIFFERENT AGENCIES AS ON 31-3-1991.

Organization	No. of Warehouses	Capacity in lakh tonnes
1	2	3
C.W.C.	495	66.48
S.W.C.	1331	93.54
Co-Operatives	59265	120.67
Total Capacity		280.69

SOURCE: Fertilizer Statistics 1990-91, FAI, New Delhi, Table No.5.0 and 5.04

C H A P T E R - VI

Summary and conclusion

C H A P T E R - VI

Fertilizer is one of the major agricultural inputs which has over the period contributed significantly towards the increase in agricultural production. Majority of people derives its livelihood from agriculture. Growth of agriculture and the conditions dominating the distribution of its output are ultimately of direct relevance to it. Agriculture is the supplier of basic essential wage good, viz. food on the one hand and it furnishes raw materials to industry on the other. The low productivity per-worker implies that the proportion of output consumed within agriculture itself remains high leaving a little surplus for use outside agriculture. The importance of increase in productivity is viewed from the angle that the larger is the proportion of agricultural output not absorbed within agriculture itself, the greater would be made available in the market for non-agricultural section of the society and urban population. Agricultural growth could constitute an exogenous source of demand for industry. In the post-green revolution period where the emphasis laid upon HYVs of wheat and rice for cultivation affected very much by the availability of irrigation and more intensive application of fertilizers. However, the success

of Green-revolution was confined to irrigated reason and mostly to the affluent class of farmers. Moreover, the green revolution also helped the farmers to intensify the cropping alongwith the demand for labour, though the mechanization restricted the application of labour.

The efforts have been made to produce and supply the fertilizers in increasing quantity but our analysis reveals that in the case of both nitrogenous and phosphatic fertilizers, loss of production in Indian fertilizer industry was mainly due to equipment problems followed by raw-material shortages, power cuts and other related factors to the fertilizer industry. Nearly 150 plants are engaged in manufacturing nitrogenous and phosphatic fertilizers in the country. The total installed capacity has reached upto 11,326 thousand tonnes of fertilizer nutrients which is 44 times more than the capacity of 1960-61. Our country is the fourth largest producer of fertilizers in the world in absolute terms and 80 percent of consumption of nitrogenous and phosphatic fertilizers is met from domestic production. The capacity utilization position has improved in recent times and it touched 87.2 percent and 82.5 percent in nitrogenous and phosphatic fertilizers respectively during 1992-93.

The commonly used feedstocks are natural gas, nephta and fuel oil. There is a change in feedstock base from nephta to gas based plants and 42 percent of the installed capacity of nitrogenous fertilizer is occupied by gas based plants. The coal-based plants are quite unsuccessful in our country.

India is also the fourth largest consumer of fertilizers in the world and total consumption has increased 20 times during 1952 to 1992. The average per hectare consumption which has merely 0.55 Kg. in 1950-51 has gone upto 78 Kg in 1990-91. The pattern of consumption varies among regions and seasons. As Pondicherry, Punjab, Haryana and Andhra Pradesh consume more quantities per hectare than the other States. The combination of the fertilizers used is narrow in Punjab and Haryana and broad based in Andhra Pradesh and Karnataka. The consumption is more during Rabi than Kharif season. Though all types of fertilizers are more or less imported but potassic fertilizer requirements are completely met by import due to non-availability of raw-materials for production. The total imports of fertilizers has been increasing over the years and it is expected to continue in future. The fertilizer policy is multidimensional and having mainly three main objectives namely, raising production of indigenous fertilizers, improving the supply conditions

and encouraging the farmers to use the larger amount for increasing the production and productivity of agricultural commodities specially of the foodgrains in the country. Our country has a target of 235-240 million tonnes of foodgrains has been fixed by the Government of India for 1990-2000 AD. This will require about 20 million tonnes of fertilizers nutrients. On the other hand the other problems which are non-availability of raw-materials, equipment problems, shortages of powers, communication, subsidy, distribution system, warehousing problems, unrealistic estimates of consumption and stocks in hand at the beginning of each crop of season, namely, Kharif and Rabi.

From the summary of the view of fertilizers, presented above the following suggestions are essential for the development of Indian Fertilizer Industry which ultimately helps in meeting the demands of the farmers of our country :

i) Proper regularization of imports:

The amount of import should only be to fill the gap between the consumption and production of fertilizers. If the production increases then the import should be checked. This will help in the development in the ferti-

lizer industry of India. This check will also be a fruitful way to protect the foreign exchange.

ii) Regular Supply of Power to the Fertilizer Industry:

It has been found that when there was delay in rains, the power supply to the fertilizer industry adversely affect the level of production. It will be in the long-term interest, of the country to exempt fertilizer industry from any power cuts.

iii) A Provision for Financial Support by the Government to the fertilizer industry:

Finance is a vital point for any industry. It is necessary that the RBI and other commercial banks should provide funds to the fertilizer industry.

iv) Monitoring the Working of the Fertilizer Industry:

For the healthy functioning and for drawing better results from any industry it should operate without hindrances which ultimately determines the rate of return and profit.

It is a fact that internal organization of the agricultural sector is such that individual farmers mostly with small land holdings do not possess one-requisit structure. It is also true that the relation between agricultural and non-agricultural sector is of almost important in the process of economic development when non-agricultural sector has better opportunity to grow, the crucial function of agriculture sector is to produce enough food and to release it for the use of non-agricultural sector at reasonable prices. It has been difficult for us to attain this goal due to over population specially in the agricultural sector and uneconomically small land holdings. The process should not hinder on this particular account and the non-agricultural sector must be able to secure the required amount of food, whatever, may be the form of institutional structure we may have desire to provide for the agricultural sector. It must be given top priority in allocating the resources to produce enough fertilizers which may be utilized to raise essential crops. The policy should be made either a fertilizer input which is imported or domestically manufactured must have relatively elastic supply schedule within the range of likelihood of needs. It is necessary inputs to receive better returns that tending to be higher which is only possible through making availability of complementary inputs. In the absence

or shortage of complementary inputs the marginal productivity will be much lower. The returns must be higher over a wide range of fertilizer input as long as the supply of complementary inputs is increased a pace.

An effort should be made to specify and define the geographic regions within a country from which large agricultural production can be realised with the application of particular fertilizer. In the long-run such attempt would help contribute much increase agricultural production at low cost of production and in the short-run it would bring higher rate of development without dislodging labour in agriculture. Such technology may save labour which can be reapplied to produced more intensive cropping patterns. The suggested approach would also help to increase the returns of scarce resources especially of capital on the one hand and to spare such scarce resources, for the development of industry on the other in the country.

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